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Table of Contents

Vol. 41, No. 16 — August 27, 1942

News Developments

Trends: Impact of Tank-Car Directive May Sift to Core of Industry 19
Refiners Alter Distribution to Comply With Directive 57 ..... *H. Stanley Norman* 20
Text of OPC Directive 57 22
Nelson Committee to Decide on Need for Fuel Rationing 22
This Week 23
Oil Industry's Part in Rubber Plans May Benefit By Probe ..... *Henry D. Ralph* 24
News From the State Capitals 26
Editorial: Fight Not Over 27
Oil Industry Is Setting Pace in Drive for Additional Scrap ..... *H. Stanley Norman* 28
Recap of Oil-Price Rulings Shows Trends of OPA Control 29
Farish Charges Case Against "Jerry-Built" House 30
Imports From Latin America Decline Nearly 65 Per Cent ..... *J. P. O'Donnell* 31
Recycling News 32
Natural-Gas News 32
Natural-Gasoline News 32
Daily Production of 4,066,500 Bbl. Certified to Producing States 34
Deaths 34
Refinery Activity and Expansion 69
Pipe-Line Activity 72
Smackover Lime Wedge-Edge Searched for Oil Deposits ..... *Robert Ingram* 76
Summary of Operations, July 99

Engineering—Operating

Weak Acid Gives Good Results in North Central Texas Wells ..... *Harry F. Simons* 37
The Halogenation of Aliphatic Hydrocarbons—Part 2 ..... *Gustav Egloff and M. Alexander* 39
Glossary of Terms Used in Petroleum Chemistry 42
Chemicals From Petroleum ..... *W. T. Ziegenhain* 42
Questions on Technology ..... *W. L. Nelson* 44
Refinery Ideas That Save $ $ $ 47
Operating Ideas 50
Refiners Learn What Factors Affect Diesel-Fuel Performance 53
War Gives Impetus to Accident-Prevention Work ..... *J. B. Harris* 54
Fuses vs. Thermal Circuit Breakers for Low-Voltage Motor Starters ..... *W. G. Taylor* 56
Engineering Fundamentals: Effect of Priming on Degree of Superheat 61
Engineering Fundamentals: Capacity of Steam Boilers 63
Co$t Engineering: Many Factors Affect Rig Costs 65
Co$t Engineering: Methods of Recovery Estimates 66
Life of Heat-Exchanger Steel Is Extended by Relining 67

Field Developments

Field Developments 75
Southwest Texas ..... *F. L. Singleton* 82
Oklahoma ..... *Carl Hoot* 83
North Central Texas ..... *Robert Ingram* 84
Eastern Texas ..... *Robert Ingram* 84
Kansas, Nebraska ..... *Carl Hoot* 86
Indiana, Ohio, Kentucky 87
Illinois 88
Louisiana Gulf Coast ..... *F. L. Singleton* 90
Texas Gulf Coast ..... *F. L. Singleton* 91
California ..... *L. P. Stockman* 92
Michigan ..... *Otto C. Pressprich* 94
Appalachian Fields 95
Permian Basin, Panhandle ..... *Robert Ingram* 97
Rocky Mountain Area ..... *T. R. Ingram* 98
Canada ..... *Victor Lauriston* 101
North Louisiana-Arkansas 100
Among Drilling Contractors 102

Markets and Prices

Group 3 Market 106
New York Market 106
A.P.I. Refinery Report 106
Gulf Coast Market 106
Refinery and Tank-Wagon Prices 107
Crude-Oil Prices 107

Additional Features

Personal Paragraphs 104
Equipment News 109
Classified Advertising 110
Advertisers' Index 112

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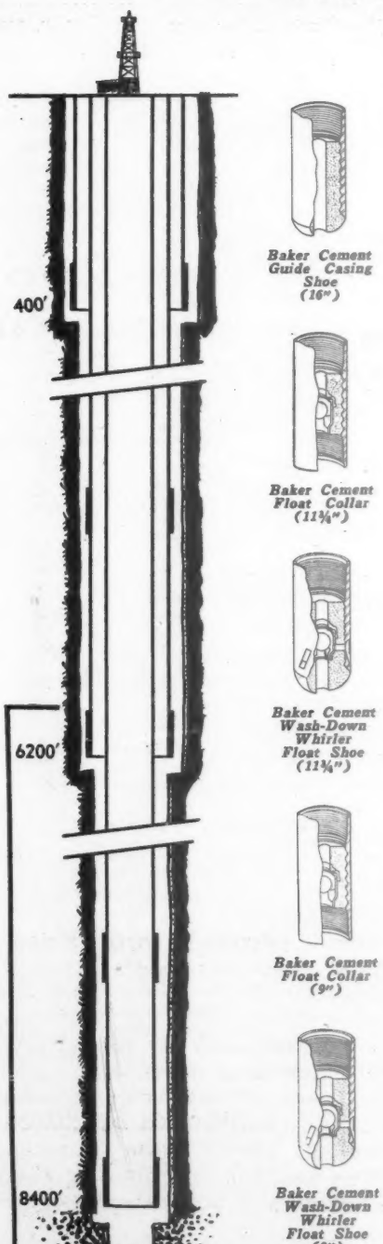
One of the most important steps in oil well drilling is the safe landing and efficient cementing of the casing. Today, with a premium on time, money and materials, it is essential that this vital operation be carried out with every possible provision being made for doing the job safely and successfully *the first time.*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Consider for example the cost factor alone. The total investment in a well, such as illustrated at left, which was drilled in a California field, approximated $100,500.00—the security of this investment being directly dependent upon the safety and efficiency with which the casing (the foundation of the well), was landed and cemented.

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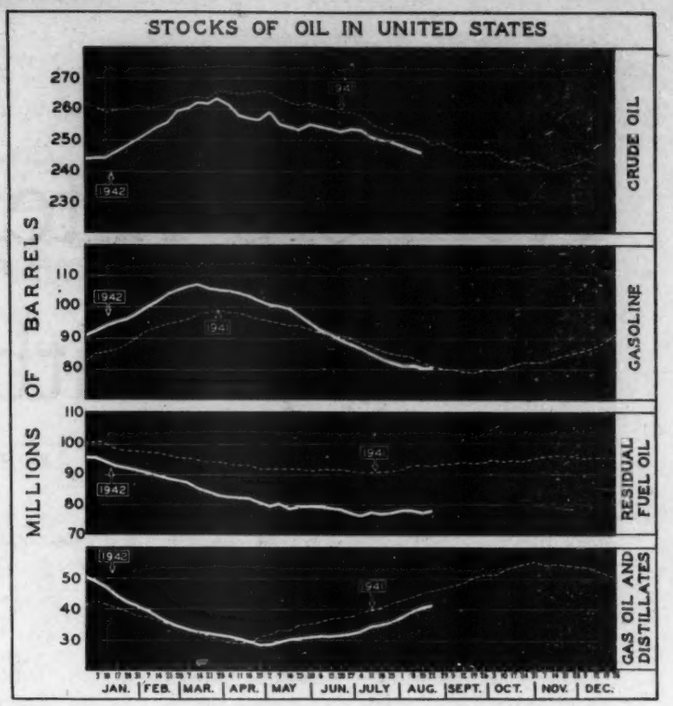
Trends

Impact of Tank-Car Directive May Sift To Core of Industry



ANALYSIS of Directive 57, issued August 24 by the Office of Petroleum Coordinator, discloses that potential impact from the restrictions may sift back to the most fundamental operations of the industry. Refiners hastened adjustments this week to offset the disturbance in producing, refining, transportation, and marketing operations caused by the directive.

But the directive was not popular and even those who, in the past, have accepted OPC recommendations without serious question, were not thoroughly convinced that it was necessary.

Most recommendations for changes in operations in the industry have been based on the argument that East Coast fuel-oil supplies are inadequate and that cold homes and interrupted manufacturing operations will be inevitable this winter, unless conditions are corrected.

Censorship obscures details of the present fuel-oil picture but combined stocks of five A.P.I. refinery districts most intimately related to the East Coast show inventories of all burning oils to be about 15 per cent less than a year ago. The country as a whole has approximately 16 per cent less fuel oil than a year ago. There are 18,394,000 fewer barrels of residual fuel oil in national inventory than a year ago but 12,322,000 bbl. of this reduction is in California stocks.

Interior refiners were quick to point out this week that stocks of fuel oil in the two large inland manufacturing districts are only 800,000 bbl. greater now than a year ago. This moderate increase of 7 per cent was accumulated by adjustment of refinery operations in compliance with OPC recommendations for deemphasizing gasoline production.

CRUDE PRODUCTION *3,952,255 bbl. daily average—up 28,390 bbl. One year ago 3,965,650 bbl.*

CRUDE STOCKS *246,433,000 bbl. as of Aug. 15—down 542,000 bbl. One year ago 251,013,000 bbl.*

GASOLINE STOCKS *80,443,000 bbl. as of Aug. 22—down 265,000 bbl. One year ago 81,194,000 bbl.*

RESIDUAL FUEL-OIL STOCKS *78,007,000 bbl. as of Aug. 22—up 585,000 bbl. One year ago 92,996,000 bbl.*

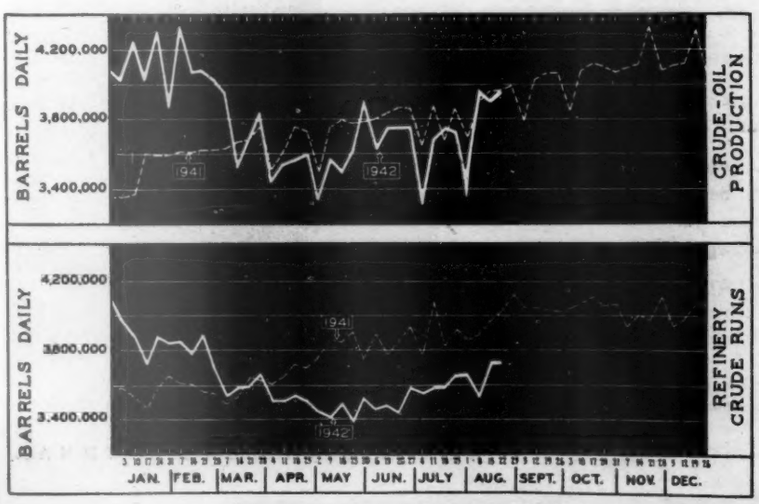
GAS OIL AND DISTILLATES *40,416,000 bbl. as of Aug. 22—up 375,000 bbl. One year ago 46,081,000 bbl.*

REFINERY RUNS *3,723,000 bbl. daily week ended Aug. 22—up 12,000 bbl. One year ago 4,041,000 bbl.*

DAILY AVERAGE PRODUCTION FOR WEEK

	Aug. 22 crude oil	Aug. OPC quota all oils	Aug. 15 crude oil
Arkansas	72,100	81,600	72,500
California	735,750	767,200	735,750
Colorado	6,585	7,200	6,420
Eastern fields	97,250	110,000	92,600
Illinois	255,120	289,300	253,965
Indiana	16,975	20,600	19,050
Kansas	297,000	281,900	290,750
Louisiana	337,150	332,600	332,650
North Louisiana	*97,100*	.....	*96,900*
Louisiana Gulf Coast	*240,050*	.....	*235,750*
Michigan	63,300	66,800	63,100
Mississippi	76,500	50,000	77,600
Montana	21,923	22,700	22,020
Nebraska	3,700	4,100	3,750
New Mexico	96,200	97,300	98,130
Oklahoma	380,150	415,500	376,750
Texas	1,401,300	1,396,700	1,383,750
East Texas	*360,000*	.....	*360,300*
West Texas	*224,550*	.....	*221,650*
North Central Texas	*137,300*	.....	*138,850*
East Central Texas	*89,250*	.....	*94,900*
Texas Panhandle	*93,900*	.....	*94,750*
Texas Gulf Coast	*419,250*	.....	*399,850*
Southwest Texas	*77,050*	.....	*73,450*
Wyoming	91,250	95,000	95,080
Total United States	3,952,253	4,038,500	3,923,865
Total production, January 1-August 22, 1942			884,516,971 bbl.
Same period last year			866,921,575 bbl.

Texas shutdown days, August 16 and 22, last week 9 and 15.



Any substantial blockade of motor-fuel movement from inland refineries would be, it is admitted, just as stifling from a practical viewpoint as direct consumer rationing. There is no defeatist attitude among inland refiners. They think they can continue serving their customers without restrictions on quantities unless the ICC or ODT refuse to modify permits of tank-truck operators.

Ultimate conclusion of the disturbance is more obscure. Truck fleets are using up irreplaceable rubber and the rate will be accelerated under the order compelling abolishment of railroad tank cars on about 20 to 25 per cent of the normal distribution of gasoline within the 20 affected states.

The increase of 16 per cent or more in the rate of interior refinery operations shown by current statistics has been a substantial factor in minimizing the repercussions of war economy on all phases of the industry.

Refiners Alter Distribution to Comply With Directive 57

By H. STANLEY NORMAN

OIL companies operating in the 20 Mid-Continent, Middle West and Southwestern states embraced in the Office of Petroleum Coordinator's Directive 57 this week worked diligently to comply with the letter and spirit of the regulation.

The directive's prohibition against use of railway tank cars for the transportation of automotive gasoline into or within the 20 states is the most complex disturbance of gasoline distribution between interior points since the war started. And, it was the conclusion of practically every substantial distributor within the 20-state zone, extending from the Rockies to the Alleganies and from the Great Lakes to the Gulf of Mexico, that a minimum of 2 or 3 weeks will be necessary to solve the complex problems of transportation which the directive poses.

Meanwhile, distributors throughout the area who received no advance warning on the directive, technically effective August 24, continued their operations along routine lines. Most refiners and distributors to whom Directive 57 applies did not receive copies of the order until the effective date. Normal operations, therefore, were continued without interruption. All who continued to use tank cars in technical violation of the stipulations filed their applications for exceptions to the directive and risked the consequences. The conclusion prevailed that punitive action of OPC particularly in view of the absence of time in which to prepare for such an abrupt transition in distribution practices, would be less severe than possible suits for breach of supply contracts.

Involves 25 Per Cent of Traffic

The ultimate result of Directive 57 will be transfer of about 20 to 25 per cent of the automotive fuel normally moved into and within the 20-state zone to tank trucks, providing, of course, that steps now under way are consummated. Provisions of the directive that compel relinquishment of an estimated 5,000 to 7,000 tank cars and substitution of truck transport for interior gasoline distribution seems, to some observers, to be at cross purposes with other government-agency efforts to conserve rubber.

Transfer of the gasoline-distribution load within the 20 specified interior states entirely to tank trucks is partially dependent on whether the ICC and the ODT are in sympathy with the OPC order. Most common-carrier truck operators who own a majority of the highway-transport facilities are limited in their scope of travel to 100 miles from base points. When permits were sought from ICC, in most instances several months to years before Pearl Harbor, the 100-mile operating radius seemed adequate to accommodate all conceivable contingencies. Intrastate operations are not subject to ICC approval and, therefore, tank-truck transportation of gasoline within the borders of any of the 20 states is no particular problem.

Some tank-truck operators hold ICC permits authorizing hauls of 150 to 200 miles or even more in a few instances. In these cases, however, the truck-fleet operator does not necessarily have permits authorizing hauling in all states. Other operators have permits that sanction hauling in any of the 20 restricted states but lack equipment to accept the additional business now tendered.

Practically all tank-truck operators this week dispatched applications to ICC requesting amendments to their permits to whatever extent necessary to accept the new business made available by shippers abolishing the use of railway cars as rapidly as possible. No indication had been given on the attitude of ICC. If ICC declines to modify truck-operating permits, the problem of supplying maximum requirements of automotive gasoline to the interior states will be magnified.

Instructions in the OPC directive to "make such purchases, sales, exchanges or loans of petroleum products affected by the directive" and to "arrange for such common use of terminals, transportation or distribution facilities as may be required in order to attain efficient utilization of all such facilities" were acted upon immediately.

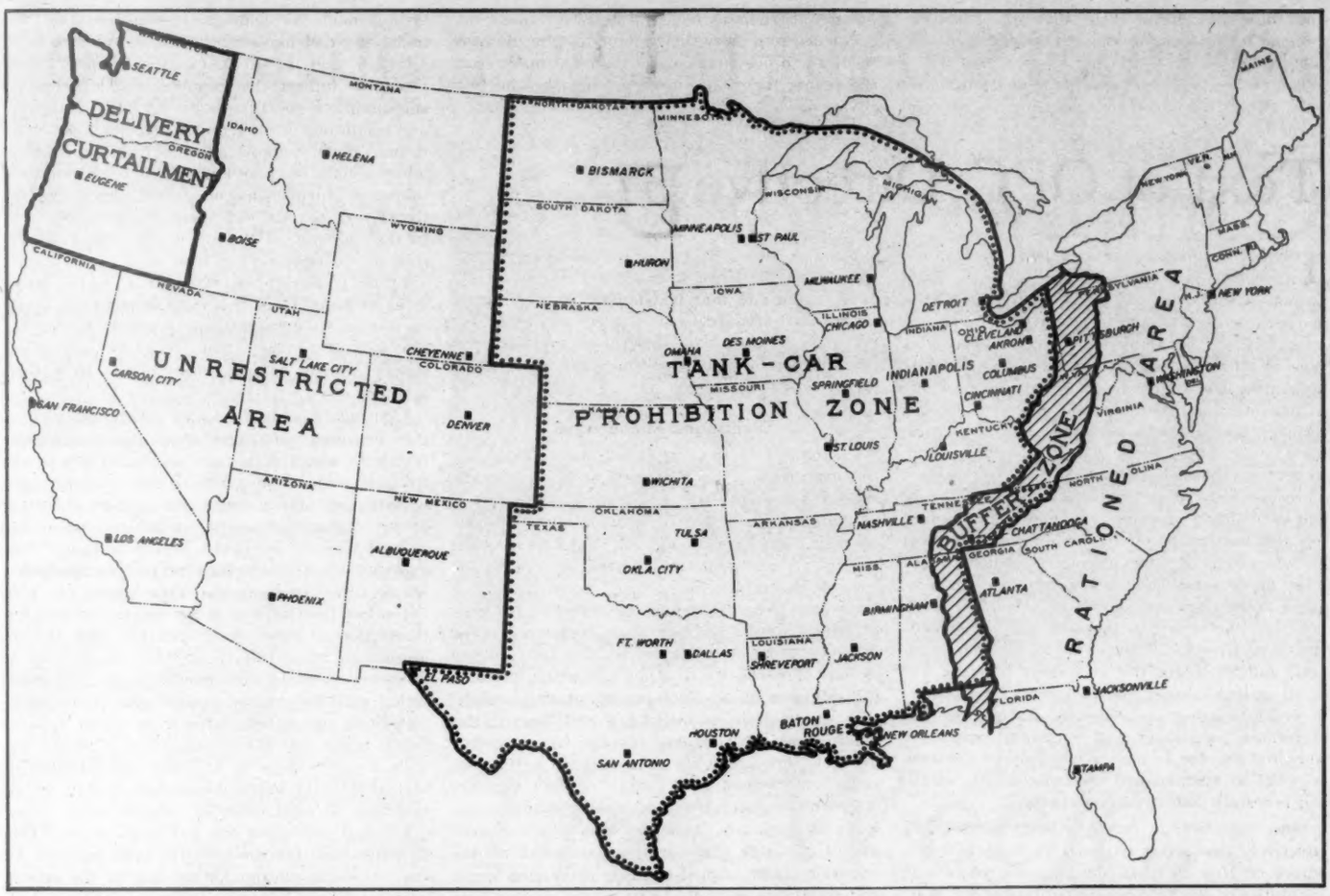
Potentialities for relief of the distribution problem within the 20 affected states by exchanges, loans, sales and purchases are strictly limited. Most companies, acting on previous instructions from OPC, have practically exhausted the product-exchange possibilities of reducing transportation. Direct sales and loans of gasoline offer even fewer possibilities of lessening the distribution requirements. Most companies are not overstocked on gasoline, chiefly because refinery operations in Districts 2 and 3 have been adjusted to yield not more than 80 to 90 per cent of their normal production of automotive fuel.

Exchanges Widely Adopted

The extent to which exchanges have been negotiated over the past few months is illustrated by operations of the major products line from the Mid-Continent to the northern part of the Middle West. Seven refining companies are tendering products to the line along the southern part of the system and nearly 30 companies are drawing on receipts at the northern terminals. The OPC directive, however, spurred refining companies to consummate all outstanding negotiations for the exchange of materials and to explore previously uninvestigated possibilities which may not have been particularly attractive prior to the new order. Probably 20 to 30 exchange agreements were concluded early this week.

The first tangible action taken by most companies in the newly restricted zone was to equip all terminals with facilities for accepting automotive fuel from tank trucks. Numerous terminals have received all products exclusively by tank

Partially stripped pumps, driveways expropriated by parkers and locked doors at this Middle West station is symbolic of what voluntary rationing, the rubber shortage, and diversion of tank cars to East Coast service have caused at many interior points



The 20 Middle West states in which tank-car deliveries of automotive fuel were banned this week and their relation to other restricted zones

car since their construction. The conversion requirements are not extensive, but the shortages of material and labor will cause delays of a week or longer, even under favorable conditions. A few points in the area cannot be served by tank trucks because of highway limitations, and it is expected that deliveries in those instances will continue by rail with OPC approval. Suppliers are also attempting to reshuffle the flow of products into the hands of jobbers in order to attain maximum efficiency. Trouble has been experienced, however, in diverting jobbers away from central terminals where all products are available to other supply points where, perhaps, automotive gasoline alone is available, even though the hauling distance may be less.

Opinion Divided on Motives

The hypothesis advanced by some oil executives that Directive 57 is a back-handed method of spreading motor-fuel rationing to the Middle West is not universally accepted. A few consider that the OPC order is a concession to the organized clamor of eastern city mayors and the Atlantic seaboard congressional delegation. Political factions from the entire rationed section of the country have long advocated less severe and more general restrictions on consumption.

The OPC statement accompanying Directive 57 refers to the probability that 5,000 to 7,000 additional tank cars will be made available by its operation for East Coast service. Approximately 70,000 tank cars were engaged in supplying oil to the East Coast before Directive 57 was issued, and during the week ended August 15 railroads handled 830,820 bbl. daily consigned to seaboard consumers. Minimum petroleum requirements on the East Coast during the last 3 months this year have been estimated by OPC and industry committees at 1,400,000 bbl. daily with an increase to 1,600,000 bbl. daily in the first quarter of 1943.

Some observers interpreted the OPC order as a barrier thrown up against the incessant clamor for interior rationing and said, that while operations under terms of Directive 57 would not be as convenient as normally, a majority of consumers could continue to obtain unrestricted quantities of motor fuel.

Certain latitude in operations is provided in the directive itself. All deliveries for the account of the Army, Navy, or any other agency, bureau, or department of the U. S. Government are exempt and may be made exclusively by tank car without limitation or special exception. Tank-car deliveries for agricultural production, essential industries or for maintenance of the public health or safety may be continued upon proof that alternative methods are impracticable or insufficient.

Applications for exceptions to Directive 57 originating in District 2 should be sent to Walter DuMont, director of transportation, Suite 1336, 120 South La Salle Street, Chicago, Ill.

District 3 applications should go to William M. Averill, director of transportation, 245 Mellie Esperson Building, Houston, Tex.

Territories in the Dakotas, Minnesota, and Upper Michigan are likely to be, according to Standard Oil Co. (Indiana), the most difficult in which to substitute tank trucks for railways in distributing gasoline. The company said that only time would tell whether supplies of gasoline can be continued on the predirective scale.

Voluntary Rationing

"The Middle West," concluded the company statement, "has been rationing itself to a considerable extent voluntarily. We are hopeful that this may continue on a scale which will enable this part of the country to help supply the rationed East without causing any real hardship here."

One of the large Mid-Continent refiners had arranged at the start of the week to report each afternoon to the District 2 director of supply what tank cars it would load the next 24 hours requiring exceptions to Directive 57. The company spokesman said he had been assured prompt consideration and that the policy on exceptions would be liberal until sufficient time had elapsed for adjustments.

Another large Mid-Continent refiner, officials said, has been shipping approximately 90 per cent of its automotive-fuel production by tank trucks for several months and that conversion of the remaining 10 per cent of outbound traffic could be accomplished without particular difficulty.

Small refiners located adjacent to producing areas and remote from the larger centers of consumption will, according to most appraisals, suffer most from the directive. Plants in southern Oklahoma, North and West Texas, dependent on the Chicago, St. Louis and similar tank-car mar-

kets for a majority of their sales are at a disadvantage because of the longer highway haul now required.

The economic limit of profitable distribution by tank trucks is between 100 and 125 miles, in comparison to railroad freight rates. If refiners are compelled to deliver their motor fuel by highway facilities to customers more than 125 miles from the plants they will suffer a transportation disadvantage which may become insurmountable.

Text of OPC Directive 57

THE diversion for war of a large part of the American and foreign-registry tanker fleet, normally employed in transporting petroleum and petroleum products to the Atlantic seaboard area, together with the loss through enemy action of other vessels of that fleet, has resulted both in an acute shortage of petroleum products in that area, and in disruption of the balance of refinery operations in that area, and other strategic areas in the United States. In order to minimize this shortage of petroleum products and, more particularly, distillates and other fuel oils, and to maintain supply of raw materials required for the maximum production of war products manufactured by the petroleum industry and other basic industries dependent upon an adequate and continuous supply of petroleum products, it is necessary to increase and supplement means of overland transportation of such products, and to obtain the maximum efficient use of all available supply and distribution facilities in order to effect an adequate wartime balance of refinery operations, the maximum output of war products and to maintain supply of products essential to maintenance of public health, safety and necessary industrial operations.

Now, therefore, in order to bring about more effectively that action required by the president's letters of May 28, 1941, defining the objectives and duties of the Petroleum Coordinator for War, and supplementing the action required under the provisions of Petroleum Directive 50, and superseding any inconsistent provisions of that directive, issued May 27, 1942, I do hereby direct that:

Applies to 20 States

§ 1510.17 *Area of restriction upon movement of certain petroleum products by rail.*—No person, natural or artificial, engaged in the business of refining, transporting, purchasing or distributing petroleum or petroleum products in the United States on or after August 24, 1942, shall move, cause to be moved, purchase or sell for movement by railroad tank car, any automotive gasoline for commercial distribution, from any point within the United States to any other point within the States of Texas, Louisiana, Mississippi, Alabama, Oklahoma, Arkansas, Tennessee, Kentucky, Missouri, Kansas, Nebraska, Iowa, Illinois, Indiana, Ohio, Michigan, Wisconsin, Minnesota, North Dakota or South Dakota.

§ 1510.18 *Purchases, sales, exchanges and common use of facilities.*—In order, during the effective period of this directive, to maintain necessary supply and distribution of petroleum products described in § 1510.17 of this chapter, and in order to avoid undue hardship upon suppliers, distributors, and purchasers throughout the states named in § 1510.17 of this chapter, all persons, natural or artificial, in those states, engaged in refining, transporting or distributing petroleum products shall make such purchases, sales, exchanges, or loans of petroleum products affected by this directive, and shall arrange for such common use of terminals, transportation or distribution facilities as may be required in order to attain the most efficient utilization of all such facilities. All such purchases, sales, exchanges or loans, and arrangements for common use of terminals, transportation or distribution facilities shall remain subject to review by the district director of supply of the Office of Petroleum Coordinator for War to the end that no supplier or distributor, in the area affected, shall be deprived of an opportunity to share equitably in the available supply and use of facilities throughout the area affected.

Exchanges Encouraged

§ 1510.19 *Functions of supply and distribution subcommittees.*—The supplies and distribution subcommittees for Districts 2 or 3 shall, subject to the direction of the Director of Supply, Office of Petroleum Coordinator for War, or of such district director as he may designate, arrange for such common purchases, sales, exchanges, and loans of petroleum products described in § 1510.17 of this chapter, and for such common use of transportation, terminal or distribution facilities as may be necessary to attain maximum efficient utilization of all available transportation, supply and distribution facilities, as will insure the maintenance of adequate supplies of petroleum products throughout the area included within the states enumerated in § 1510.17 of this chapter. All such common purchases, sales, exchanges, and loans of products, together with the common use of available transportation, terminal or distribution facilities shall be made upon such terms and conditions as will afford every supplier and distributor in the area affected a fair share of, and equitable opportunity to share in, the total supply and use of facilities throughout the area affected.

§ 1510.20 *Reports.*—All persons effecting purchases, sales, exchanges, or loans of products, or arrangements for joint use of transportation, terminal and distribution facilities, as referred to in § 1510.18 and § 1510.19 of this chapter, shall promptly inform the supplies and distribution subcommittee for Districts 2 or 3, of the terms and conditions of all such arrangements or agreements. Each supply and distribution subcommittee shall compile and digest such information and furnish a condensed report thereof weekly to the district director of supply and to the Director of Supply of the Office of Petroleum Coordinator for War.

§ 1510.21 *Exempted movements.*—The provisions of § 1510.17 of this chapter shall not apply to movement of petroleum products by or for the account of the Army, Navy or any other agency, bureau or department of the U. S. Government.

§ 1510.22 *Exceptions.*—Any person affected by this directive who can show that compliance therewith would result in the nondelivery of petroleum products shown to be necessary for agricultural production, continued efficient operation of any essential industrial establishment, or for maintenance of the public health or safety may apply to the District Director of Transportation of the Office of Petroleum Coordinator for War for either District 2 or 3 for special written authorization to make such deviation from the requirements of § 1510.17 of this chapter as is necessary to avoid such result. No such authorization shall be granted except upon proof, satisfactory to the district director to whom application is made, that alternative action in accordance with the provisions of § 1510.18 and § 1510.19 of this chapter is impossible, impracticable or insufficient to meet essential requirements.

§ 1510.23 *Effective date and termination.*—This directive shall become effective upon issuance by the petroleum coordinator for war or the deputy coordinator and, unless sooner revoked by such officer, shall terminate, in so far as the commencement of any new action by any person is concerned, upon the issuance and promulgation by the War Production Board of an order requiring direct allocation of materials movement by railway tank car.

•

Nelson Committee to Decide On Need for Fuel Rationing

WASHINGTON, D. C.—Decisions on rationing fuel oil in the East will be made by a special committee of three appointed by Donald M. Nelson, chairman of the War Production Board, in accordance with a recommendation of the board at its August 18 meeting.

The committee consists of Robert P. Patterson, under secretary of war; Harold L. Ickes, petroleum coordinator; and Leon Henderson, price administrator. Mr. Nelson will sit with the committee in its meeting. Although Mr. Ickes is now out of the city on vacation, it is understood an alternate will act for him in preliminary discussions.

Mr. Nelson said that the committee would have full power to act. It will determine, first, whether or not the use of fuel oil should be curtailed in the East Coast area during the 1942-43 heating season, and, second, what method of rationing should be used if a decision to curtail is made.

That some form of curtailment will be recommended is considered inevitable because of reports that stocks of heating oil at present are only about half of normal. Some authorities believe that on the basis of present transportation facilities the supply of heating oils in the eastern states will be only about one-third of demand unless this is an unusually mild winter. A reduction in the value of gasoline rationing cards is under consideration as one way to divert more transportation facilities to fuel-oil movements.

Several methods of fuel-oil rationing are under study. The Office of Price Administration, in cooperation with heating engineers and fuel distributors, has worked out a plan involving consumer coupon books. The eastern states would be divided into four geographical regions, with coupon values varying according to average prevailing temperatures. Coupon books would be issued on the basis of the size and heating characteristics of each house, and a single group of coupons would be good only during one of five periods into which the heating months would be divided.

Considerable increase in the amount of petroleum products reaching the eastern region is an-

ticipated during the coming months, but there is general pessimism regarding prospects that all demands can be met.

W. E. Callahan, manager of the Tank-Car Division of the Association of American Railroads, said last week that the railroads hoped to be able to bring in around 1,000,000 bbl. per day. He said that recent steps taken by the Office of Petroleum Coordinator to make more tank cars available for eastern service should enable the railroads to increase shipments to 900,000 bbl. per day and that if additional locomotives can be obtained and more through oil trains scheduled the movement could be increased above that figure.

Some increases in movements might be accomplished by financial adjustments now under consideration, including a lower freight charge for through train-load shipments of petroleum, and an increase in the ceiling price of fuel oil in the East.

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U. S. Mission Studying Aid for Mexican Oil Industry

WASHINGTON, D. C. — Rehabilitation of the Mexican petroleum industry is being studied by a technical mission which the U. S. Government is sending to that country at the request of the Mexican Government.

The mission, which left Washington August 20, is headed by E. De Golyer, director of reserves of the Office of Petroleum Coordinator. Other members are A. H. Chapman, assistant director of the Foreign Division of OPC; Earl Gard, engineer of the Betchel-McComb-Parsons Corp.; and Frank Mack, construction engineer of Universal Oil Products Co. The latter two were loaned to OPC in order to have governmental status for the mission. Attached to the mission is G. W. Wattles, priorities specialist of the War Production Board.

Tank-Car Movement Sets New Peak of 830,820 Bbl. Daily

WASHINGTON, D. C.—Daily tank-car shipments of crude and petroleum products to the East Coast reached another new high of 830,820 bbl. during the week ended August 15.

The record-breaking eastward movement topped the former mark of 809,430 bbl. daily attained in the week ended August 6. To move this record volume, 29 oil companies reported that they loaded and shipped to the seaboard a total of 27,694 cars.

On the basis of an average of 210 bbl. per car, these loaded cars carried 5,815,740 bbl. of petroleum and products during the week.

S. A. Montgomery to Become Manager of Whiting Refinery

CHICAGO.—S. A. Montgomery, manager of Standard Oil Co. (Indiana) refinery at Wood River, Ill., has been promoted to a similar position at the Whiting, Ind., plant, effective September 1, it was announced here this week at company headquarters. Mr. Montgomery will succeed Dr. E. J. Shaeffer at Whiting, who has been in ill health and will retire.

Dr. W. J. McGill, general superintendent of the Wood River refinery, will be promoted to succeed Mr. Montgomery at that plant and T. E. Stockdale, an assistant superintendent of the heavy-oils department at Whiting, will be promoted to succeed Dr. McGill as general superintendent at Wood River.

These bottlenecks, unlike a more common variety, are for a useful purpose. Ohio Oil Co. couldn't get delivery on raschig rings to pack a fractionating tower. So glass bottle necks as a substitute are being explored

This Week...

TRANSPORTATION.—OPC Directive 57, effective August 24, prohibits tank-car shipment of motor gasoline into or within Districts 2 and 3, with some exceptions. Refiners shifting to tank-truck facilities. Highway-transport operators apply for amended ICC permits necessary to meet new conditions. OPC anticipates 5,000 to 7,000 additional cars will be freed and become available for East Coast service. . . . Railroads set another peak in moving 830,820 bbl. of petroleum daily to East Coast. Ultimate goal is now 1,000,000 bbl. . . . Temporary use of Great Lakes tankers or barges between Toledo and Cleveland, Ohio, approved, to make earliest possible use of rearranged pipe-line facilities terminating on East Coast. . . . Shippers continue criticism of avoidable delays in turnaround of tank cars at eastern terminals. . . .

PRODUCTION.—National output of 4,066,500 bbl. daily authorized next month. . . . California's production quota given interim boost of 23,800 bbl. daily, effective August 16, to meet growing demand for fuel oil. State unable to make previous quota. . . . Kansas, Texas, Louisiana, and New Mexico assigned higher quotas next month. . . .

RUBBER. — Butadiene emergency-conversion program exceeding expectations. One of Rubber Reserve large plants, the one at Gary, Ind., deferred. . . . Baruch committee holding daily confidential hearings, calls technically skilled for fact-finding job. . . . Friction between Rubber Reserve and OPC reported, under the surface. Unlikely to flare up until probe is completed, possibly never. . . . One cyclohexane project switched to alcohol. Otherwise proportions of participation unchanged as between petroleum gases and agricultural alcohol. . . .

REFINING.—Interior manufacturers consummate all possible pending negotiations for exchanges of products, to implement Directive 57. . . . Some refiners critical of OPC directive, assert it is indirect, back-door imposition of rationing. Others think it possibly a checkmate against more drastic restrictions fostered by OPA and ODT. . . .

RATIONING.—Coordinator Ickes, Price Administrator Henderson, under Secretary of War Patterson, and WPB Director Nelson to decide necessity of eastern fuel-oil rationing. . . . Reduction of eastern gasoline ration considered as means of increasing fuel-oil deliveries. . . . Tank-car prohibition order in 20 inland states may be gesture to eastern politicians clamoring for rationing on nation-wide scale. . . . OPA cracks down on ration violators. Closes violating stations for various periods, depending on flagrancy of offenses. . . .

MARKETS.—Most product prices firm. . . . Higher crude demand to aid southwestern and Pacific Coast producers, if transport stands up. . . . No immediate reaction reflected in Middle West and southwestern product markets, following Directive 57. . . . Oil securities rally slightly. Thirty representative stocks averaged, for week ended August 22: High, 23.05; low, 22.30; close, 22.84. . . .

PRIORITIES.—Plans proceeding quietly for abolishment of P-98, substitution of PRP variation, after September 15. . . . PRP restrictions loosened on several commodities. . . .

Oil Industry's Part in Rubber Plans May Benefit By Probe

By HENRY D. RALPH

WASHINGTON, D. C. — Sweeping changes in the Government's synthetic-rubber program, particularly as it affects the petroleum-refining industry, are anticipated when the Baruch-Conant-Compton committee makes its report to the president.

There have been no "leaks" of information, but from the makeup of the committee, the way in which it is operating, and the type of material it is gathering, it is apparent to this observer, and to others as well, that the committee is bound to conclude that a large part of the approach to the problem has been a mistake and that much of the planning of the past 6 months should be scrapped.

There are good reasons for believing that the committee will not recommend any substantial increase in the amount of butadiene to be made from alcohol.

Pending fruition of the synthetic-rubber program and any freer use of civilian tires it may provide, Coordinator Ickes seeks facts on conserving his casings. Here he listens to an explanation of how a new gage shows the mileage remaining in his tires

On the contrary, it probably will recommend that the petroleum industry produce all the butadiene presently allotted to it, and possibly more. If it is recommended that the buna-S rubber program be enlarged above its present 700,000-ton goal, the oil industry will be called on to supply the additional butadiene required.

It seems inevitable, considering the many factors involved, that the committee will have to recommend the scrapping, or at least the deferment, of a considerable number of the large butadiene plants which the Reserve Rubber Co. had planned to build, unless the over-all program is enlarged. Instead, greater reliance will be placed on the production of butadiene from existing oil refineries and natural-gasoline plants converted to war products, the program now being actively pushed by the Office of Petroleum Coordinator.

Finally, the committee logically should recommend better coordination of the program, probably through creation of a new agency, to centralize the activities now spread out through the Rubber Reserve Co. and its affiliated Defense Plants Corp. and Defense Supplies Corp., the OPC, War Production Board, Office of Price Administration, and Office of Defense Transportation.

The Baruch committee is holding no public hearings but it is holding private consultations almost continuously. It has recruited more than a score of prominent scientists and experts in various fields, some from Government and some from other connections, and the caliber and competence of this group is highly praised by all who have come in contact with it. These experts have divided the field into specific problems on which subcommittees are making intensive studies. The various government agencies concerned with rubber have made special reports to the committee and have opened their files to it. Also, it is understood that hundreds of suggestions are pouring into the committee from industry and private citizens.

While the committee is thus at work, there have been a number of important developments in the synthetic-rubber program which are interesting in themselves and which may be straws in the wind indicating the probable trend of the Baruch report.

Chief among these was the official announcement that the refinery-conversion program is under way, made last week by Deputy Coordinator Ralph K. Davies. Although the conversion program has been under way for many weeks and is not news to the refining industry, the summary contains considerable information not previously made public. (See Refinery Activity pages in this issue.)

Another significant development was the action of Rubber Reserve in halting further construction of the 100,000-ton butadiene plant of Rubber Synthetics, Inc., near Gary, Ind. The official announcement said that the project was deferred, rather than permanently abandoned, and the reason given was that supplies of butadiene have been developed in other parts of the country, using existing equipment or by modification of plants already under construction. Rubber Synthetics, Inc., was formed by Standard Oil Co. (Indiana), Cities Service Oil Co., and Sinclair Refining Co. for the purpose of jointly handling a contract to build the plant for the Defense Plants Corp. and to operate it for Rubber Reserve Co.

Officials of the Rubber Reserve Co. explained that this cancellation, or "deferment," of the Gary project was not owing to the development of OPC's refinery-conversion program, but was done because it appeared that an equivalent 100,000 tons of butadiene would be made available from increased output of other Rubber Reserve plants and by conversion of certain other facilities, such as gas plants, not included in the OPC program. It is understood that a considerable portion of this anticipated increase in butadiene facilities is on the West Coast.

Reinstate Texas Plant

Another development is reinstatement in Rubber Reserve's program of the butadiene plant to be built in Texas by the Phillips Petroleum Co. This project was among the first on which Rubber Reserve issued letters of intent, but later was deferred because of the large amount of critical construction materials involved and it did not appear on the list of projects which Stanley Cross land, vice president of Rubber Reserve placed in the record of the Gillette investigating committee of the Senate on July 17.

This plant originally was scheduled to produce 45,000 tons of butadiene annually, using a process developed by Phillips and using butane as the charging stock. Some 2 months ago Phillips was told to suspend further work and to try to find some way of reducing the amount of critical materials required, such as by switching to butylene as the charging stock or by adopting the Houdry process. It is now learned that Phillips has revised its construction plans to use considerably less critical materials and has also agreed to contract for a considerably higher yield of butadiene than it felt prudent to promise earlier, and this plant is now back in the Rubber Reserve program, using the Phillips process and starting with butane.

The Houdry Process Corp. has been bringing pressure, publicly and privately, for adoption of its process for making butadiene from butane, and many competent refining engineers believe it

has great merit for a part of the program. It will be used rather extensively in the OPC refinery-conversion program, but officials of Rubber Reserve say there is no change in the Houdry situation as regards their program, meaning that none of the Rubber Reserve plants are scheduled to use the Houdry process. However, there are reports, apparently with some foundation, that from one to four Houdry process butadiene plants may receive approval of Rubber Reserve.

Approval of Houdry process plants may be contingent on an increase in the over-all synthetic-rubber program. Rubber Reserve officials state that there has been no change in this program except for the recent doubling of the butyl rubber phase, and that 700,000 tons capacity of buna-S is still the goal. However, Secretary of Commerce Jesse Jones has several times suggested that the program should be increased to 1,000,000 or 1,200,000 tons of all types of synthetic rubbers but WPB has not felt justified in allocating the critical construction materials for such an expansion.

Still another interesting development is the elimination from the Rubber Reserve program of the 20,000-ton butadiene plant to be constructed by the Koppers United Co., which was to charge cyclohexane. It is understood that this decision was due to an impending shortage of benzene Instead, this plant will be constructed to make butadiene from alcohol, using the process of the Carbide & Carbon Chemical Co. In addition, Koppers will be given the contracts for three of the 20,000-ton alcohol butadiene plants previously assigned to Carbide & Carbon, giving Koppers 80,000 tons of the program. This increase of 20,000 tons in the alcohol end of the program raises this phase of the plan to 225,000 tons of butadiene capacity annually.

Carbide & Carbon officials estimated that it would require 186,000,000 gal. of alcohol per year to produce the 200,000 tons of butadiene which at that time Rubber Reserve had allotted that company. Officials of the Publicker Commercial Alcohol Co., which is promoting a competitive butadiene process, also estimated that it would take around 186,000,000 gal. of alcohol to make 200,000 tons of butadiene, and they gave that figure as the anticipated alcohol production of converted distilleries.

Critical Materials Required

The amount of new critical materials required to construct a plant to produce butadiene from alcohol is considerably less than the requirements for plants of the type originally planned by Rubber Reserve to make butadiene from butane, based on equal production capacities. However, the switch to butylene as the charging stock in most of the Rubber Reserve plants reduced construction requirements considerably. If new alcohol plants were required the amount of steel and copper would be about the same for either process, according to many estimates, though there is considerable argument over this point.

Another argument against expansion of the alcohol end of the program, which undoubtedly has been placed before the Baruch committee, is the raw material cost. Alcohol yields 2.2 lb. of butadiene per gallon, and at the present ceiling price of 50 cents per gallon of alcohol the raw material cost is about 22.5 cents per pound of butadiene. Butylene yields 3 lb. of butadiene per gallon, and figuring butylene at current prices of between 9 and 12 cents per gallon the raw material cost is 3 or 4 cents per pound of butadiene. Raw material costs are not the deciding factor in a war emergency program financed by the Government, but they do have some bearing on the case.

Costs of converting alcohol and butylene into butadiene are considered as being about the same. No attempt has been made to estimate conversion costs very closely because all the Rubber Reserve plants will be owned by the Government and operated by contractors on a fee basis. Conversion costs would vary greatly according to the location of the plant, local labor costs, fuel costs, rate of investment amortization, method of bookkeeping, and other factors.

No contracts or letters of intent have been issued by Rubber Reserve for the butylene-glycol process of producing butadiene, although Joseph E. Seagram & Sons of Louisville, Ky., announced to the press last week that a $4,000,000 plant may be started there soon. It is understood in Washington that the Seagram company is proposing to construct the plant with its own funds provided it can obtain priorities for materials.

The Seagram announcement said that the plant would consume some 15,000 bu. of grain per day and would yield 8 lb. of butadiene per bushel at a cost of around 20 cents per pound which later might be reduced to 15 cents.

Refiners Responding Willingly

Meanwhile, the petroleum refiners are responding enthusiastically to the refinery-conversion program of OPC. Definite proposals already received by OPC from the industry call for the production of 200,000 tons of butdiene per year, and additional proposals are coming in daily. Some of these proposals have already been passed on to other government agencies with recommendations that financing arrangements be made, while others are in various stages of consideration and a few may be disapproved for one reason or another.

OPC engineers are certain that this program will result in capacity to produce at least 200,000 tons of butadiene annually to be in full operation within 4 to 6 months. They believe that the conversion program could be made to yield any additional amount of butadiene required up to 600,000 tons per year, within 6 to 8 months, if it were decided to use more new critical materials and to concentrate on butadiene production at the expense of other petroleum war products

If this were done it would just about eliminate necessity for construction of any of the big butadiene plants planned by Rubber Reserve, including the alcohol plants. Rubber Reserve now has letters of intent covering construction of capacity for 648,200 tons of butadiene annually, of which 225,000 tons is from alcohol and 423,200 tons is from petroleum. One short ton of butadiene, plus approximately 500 lb. of styrene, less manufacturing losses, produce 1.1 long tons of synthetic rubber.

Thus, OPC's conversion program could take care of at least half, if not all, of the output of butadiene Rubber Reserve contemplated on obtaining from its huge petroleum-process plants. Or, it could provide the butadiene for expanding the over-all program to 1,000,000 tons capacity or greater by adding it to the Rubber Reserve plans.

But Rubber Reserve appears to be ignoring the OPC program, in a way which suggests that there is considerable rivalry beneath the surface as to which of the two agencies will receive the blessing of the Baruch committee.

Officials of Rubber Reserve say they will not let financing problems stand in the way of converting oil refineries to produce war products, including butadiene, and that Rubber Reserve, Defense Plants Corp., or Defense Supplies Corp. will make whatever type of contract is appropriate or desired for an individual conversion project. A likely form of financing would be a contract to purchase butadiene from converted refineries for use in the copolymerization plants to be operated for Rubber Reserve by the rubber companies.

Rubber Reserve officials point out, with reason, that the OPC refinery conversion program should not properly be called a "quick" butadiene program. First, because it will take 4 to 6 months to get production and some of Rubber Reserve's plants will be in production by that time, and, second, because the refinery-conversion program calls for recovery of many petroleum war products in addition to butadiene, many of them interchangeable.

Pending the report of the Baruch committee, all officials having anything to do with the rubber program are extremely careful not to criticize one another, but it is quite evident to close observers that one of the major squabbles which will have to be decided by this committee, or by a new rubber agency set up on its recommendation, is whether or not to proceed with the butadiene plant-construction program of Rubber Reserve.

The backbone of the Rubber Reserve program originally was a series of 50,000-ton butadiene units, although a number of these have now been deferred and there are several smaller units in its program. Some oil men have looked upon units of this size as monstrosities, requiring the fabrication of valves and equipment in sizes never before made. A suggestion that these large units may be broken up into smaller units was contained in a letter sent by the War Production Board last week to contractors of oil-refinery and synthetic-rubber-plant construction asking them to design their plants so as to use only standard sizes and designs of equipment in so far as possible.

The refinery-conversion proposals now coming in to OPC call for butadiene units of from 10,000 to 20,000 tons annual capacity, averaging around 15,000 tons, and many refinery experts believe plants of this size are more practical at the present time. Production costs might be lower in larger, single-purpose plants, but the whole synthetic-rubber program is of such uncertain duration and so subject to technological changes that an extremely good case can be made on these grounds for the OPC conversion program as against the Rubber Reserve's approach through construction of huge, all-new plants.

Conversion Program Has Edge

From the standpoint of use of critical materials, the conversion program unquestionably has the edge over the Rubber Reserve projects, certainly for the first 200,000 tons of butadiene and probably for substantially larger quantities. Conversion proposals so far approved by OPC call for an average of less than 10 per cent of new critical material, the balance being existing refinery facilities, much of it moved from scattered locations and assembled in one spot. OPC hopes that the conversion program can be carried through with no more than 15 per cent of new critical material, and at present is not approving any project requiring more than 20 per cent.

As the conversion program advances and existing equipment becomes harder to locate, the percentage of new material required will increase and eventually will reach the point where it would about equal the needs for entirely new plants of comparable capacity. By the time this point is reached, however, many authorities feel, the butadiene capacity from converted refineries would be about equal to that contemplated by Rubber Reserve's projected new plants.

The virtue of the refinery-conversion program, in view of OPC experts, is its flexibility. While they anticipate a market for all the butadiene which can be purchased, many of the refineries could easily be adjusted to produce larger quantities of other war products such as components of 100-octane gasoline.

STATE CAPITALS...

OKLAHOMA

MARKET DEMAND for Oklahoma crude oil and distillate during September will be determined at the Corporation Commission hearing in Oklahoma City September 1. Purchasers and producers of crude oil will meet informally with the Conservation Department at 10 a.m., followed by the commission's formal hearing at 11 a.m. The two meetings will be held on the third floor of the new office building southwest of the State Capitol.

The OPC quota assigned to Oklahoma in September totals 415,300 bbl. daily, a decrease of 200 bbl. from the allocation in August. The figures include crude oil, natural gasoline and distillate production.

TEXAS

BASIC ALLOWABLE production for Texas effective September 1 has been set by the Railroad Commission at 1,851,374 bbl., but by an intricate schedule of shutdown days, actual daily average allowable for the month is expected not only to be reduced to the recommendations of the Office of Petroleum Coordinator but also to be adjusted in respect to individual fields to provide the required special crudes desired for the manufacture of needed war products. The new basic allowable is a reduction of 20,008 bbl. from the allowable of August 15.

The September proration order calls for nine general shutdown days. These are set for September 5, 6, 12, 13, 19, 20, 26, 27 and 30. However, there are numerous exceptions.

Fields exempt from all shutdown comprise:

Dart Creek, Loma Alta, Luling-Branyon and Salt Flat, District 1; Cordele, Greta Deep, Heyser, Mellon Creek, Mission River, Oakville, Plummer, Refugio-Fox and Victoria, District 2; Arriola, Bammel, Barbers Hill, Batson New, West Beaumont, Boling, Buckeye, Clay Creek, Conroe, Cotton Lake, South Cotton Lake, Damon Mound, Danbury, Eureka Heights, Goose Creek, High Island, Hitchcock, Hull, Humble, Kubela, Livingston, Lochridge, Louise, Mercy, Magnet-Withers, Manvel Oligocene, Markham, Mykawa, North Dayton, West Orange, Raccoon Bend, Sandy Point, Silsbee, Turtle Bay, South Thompsons, West Columbia, District 3; Boyle, Charamousca, Clara Driscoll (3,200-ft. sand), Eagle Hill, Minnie Bock, Moca, Seven Sisters, Sam Fordyce, Plymouth, Rincon and White Point, District 4; Mexia, Powell, Richland, Sulphur Bluff and Wortham, District 5; Boggy Creek, Cayuga, Grapeland, Lone Star, Talco, Rodessa and Trinity, District 6; Eastland County, Erath County, Loving and Stephens County, District 7-B; Beddo, Big Lake and World, District 7-C; Hendricks, Howard-Glasscock, Iatan-East Howard, Jamison-Pollard, Leck, Monroe, Taylor Link, Snyder and Yates, District 8; Johnson (Cooke County), K.M.A. Ellenburger, Hults-Owens, Joy-Mississippi Lime, Antelope and Votsberger, District 9.

Three shutdowns, September 5, 6 and 12 are provided for the following fields: Lolita and West Ranch, Jackson County, District 2; Lovell's Lake, Amelia, Sugarland, Clear Lake and Webster, District 3; Orange Grove, District 4; Bonita, Clingingsmith, Fargo, Hoefle, Ringgold and Walnut Bend, District 9.

Wasson field, in District 8, will have 6 idle days, being exempt from the general shutdowns on September 26, 27 and 30.

In addition to the general shutdowns, 2 days, September 2 and 9, are ordered for Sand Hills Permian and Slaughter fields, in District 8; 4 additional shutdown days, September 2, 9, 16 and 23, for the Goldsmith, Keyston Colby, and Sand Hills Ordovician fields, District 8; and 6 additional shutdown days, September 2, 7, 9, 16, 23 and 29, for South Cowden, Dune, Keystone Lime, Means, Penwell, Waddell and North Ward, also District 8.

CALIFORNIA

THE SERIOUS CONDITION of fuel-oil supply in California has forced the production committee for District 5 to make a special increase in the California quota for August of 23,800 bbl. per day and this action has been approved by the OPC. The increase was made retroactive to August 16. The increase raises the state's August allowable to 750,000 bbl. per day. Higher allowables have been apportioned to fields producing crude yielding highest percentage of fuel oils and to those where properties can produce at the higher rates. The higher allowable is expected to increase fuel-oil production by approximately 10,201 bbl. daily. It is extremely unlikely that the state will be able to attain the new allotment. Most of the so-called flush fields produce a light grade of crude oil and are included in the group of fields assigned higher allowables. The increase was approved at a recent meeting of the general committee for District 5 which based its action on continued heavy withdrawals of stocks, particularly residual fuel oil. Preliminary estimates indicate the probability that withdrawals from fuel-oil storage by California companies has exceeded 57,500 bbl. per day during the first 7 months of the current year.

The new schedule applies in fields whose crude yields 57 per cent or more fuel oil, raising allowable to their maximum efficient rates of production. Pools whose production yields 32 per cent or less fuel oil are decreased to 52.6 per cent of their remaining allocations. In comparison, the original August schedule gave maximum production to pools whose crude yields 70 per cent or more fuel oil, while decreasing pools whose crude yields no more than 32 per cent fuel oil. Increases were not assigned Coalinga Nose, Paloma, Kettleman Eocene, Aliso Canyon and Wilmington because such increases would cause blowing of gas to the air, which is specifically prohibited by the OPC. This same condition applies to Santa Maria Valley with the additional factor that transportation facilities are inadequate.

PEPPERS APPOINTED OKLAHOMA OIL-COMPACT REPRESENTATIVE

CHARLES C. PEPPERS, Peppers Gasoline Co., Oklahoma City, appointed last week as assistant representative for Oklahoma on the Interstate Oil Compact Commission by Gov. Leon C. Phillips, will bring to the commission the benefits of almost 30 years' experience as an independent operator.

Although he has been involved in litigation and Corporation Commission hearings pertaining to oil and gas regulations, he believes firmly in conservation and is a strong advocate of efficient and honest administration of mineral laws. Although not an official of the Champlin Refining Co., Enid, Okla., he has been active in the policies of that company.

CHARLES C. PEPPERS

Mr. Peppers was born in St. Marys, Kans., on September 14, 1894. In early boyhood he moved to Tulsa, where he attended the common schools. While working in various branches of the oil industry around Tulsa, he studied accounting at night school.

In 1916 he became interested with H. H. Champlin of Enid and organized the Peppers Gasoline Co. in 1917. The company has operated in the Garber, Billings, Tonkawa, Oklahoma City, and Lucien fields. The company built the first gasoline plant in the Garber field and has operated a gasoline plant and refinery in the Oklahoma City field since 1930. The Peppers Gasoline Co. built a gasoline plant in the Lucien field in 1938.

Mr. Peppers married in 1916 and has one son, 23 years old, who is now in the U. S. Navy. In the struggle with the Axis Powers he believes that all individuals engaged in the war effort, especially those drafted from private industry to serve with the Government in Washington, should take the same oath of allegiance and be subject to comparable penalties for failure to perform their duties as the men in our armed forces. With the adoption of this policy, Mr. Peppers feels that the nation will improve in the war effort.

Among his many friends in the state he regards Mr. Champlin, president of the Champlin Refining Co., as his best friend and colleague. His main hobbies are fishing, golfing, and all outdoor sports. In recent years his increased business activities have curbed his recreational interests to such an extent that his work is his main hobby.

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Fight Not Over

The fight to retain the percentage depletion and the options covering intangible developments costs in producing operations, isn't over.

It is true that the ways and means committee of the House rejected the Treasury's recommendations that these allowances be eliminated in the 1942 tax bill and there is reason to believe that the Senate finance committee will take similar action.

These developments reveal how convincing the oil industry's arguments are in favor of the retention of these provisions, when presented to committees familiar with the oil industry's operations, whose membership has had time to consider every phase of the tax problem.

But the committees' actions might easily be ignored when the nation's greatest tax bill reaches the floors of the House and Senate. The powerful influence of the Treasury will continue to be against the tax position of the natural-resource industries. In addition many legislators refuse to accept the fact that the tax burden has become so great that it must be shared by all. They are still looking for ways out with a vote appeal that will not involve telling their constituents that the new war taxes must be placed on every doorstep.

Actually the increased income through the elimination of these tax provisions which have withstood the tests of a quarter-century, would be an insignificant part of the coming tax bill and the attempts that have been made to cover up that fact raise a question as to the sincerity of those who appear to be trying to dodge the real tax issues.

The matter does not stop with the producing division of the petroleum industry. It is of direct concern to every refiner, pipe liner, marketer, and consumer.

The depletion and intangible-cost features are partially a development of the other war when it was realized that due to the dependence of the Allied success on petroleum supplies, the Government should recognize the peculiar operating problems of the petroleum industry in the application of income taxes.

They are not a gratuity from the Government to oil operators. Never has the Government done anything on which it has received a greater return. In the matter of revenues, the oil business for several years has been the largest taxpayer, with the prewar levels well in excess of 1½ billion dollars yearly. Affiliated enterprises, such as the automobile and rubber industries, add many hundreds of millions more each year.

It can be shown that this tremendous tax revenue in which all governmental units—federal, state, county, and city—share, springs largely from the fact that oil operators have been able to find oil. They would not have found it in the quantities they have, had it not been for the depletion and intangible-cost incentives.

The cheapness of petroleum products, the 20-billion-barrel reserves, and the strong oil position of the United Nations come from the fact that oil operators have been willing to risk capital in finding new oil fields. Should the Treasury's tax program prevail, oil will be weakened at its foundation and every user will ultimately pay the revenue savings many times over.

These facts and many more should be brought to the attention of every senator and representative in the oil and non-oil-producing states. It is of concern to all sections of the country. Several oil and natural-gas associations have cooperated in presenting the industry's position at Washington. They can answer any question which might be raised by those who are not informed.

Furthermore, the industry's position has many strong friends from the oil country in Congress, such as Congressman Disney, who can be relied upon to do their part. The fight must now be taken to the consumer states and the congressional districts.

Oil Industry Is Setting Pace in Drive for Additional Scrap

By H. STANLEY NORMAN

THE petroleum industry, although given two previous fine-tooth combings for iron, steel and rubber scrap, is setting the pace in the current general salvage campaign, particularly in the 23 producing states and 37 in which refineries are located.

General salvage committees in most of the oil states cite the petroleum industry as an outstanding example of cooperation and report that the campaign practically runs itself in producing fields and manufacturing plants.

The industry's chief complaint and one that resulted in adoption of a resolution condemning the practice by the Oklahoma salvage committee is that dealers have, in certain instances, resold or offered junked materials as used equipment. Physically, government officials contend, the resale of usable equipment is desirable and is, therefore, sanctioned. Psychologically, however, admits the salvage section of the War Production Board, the junk dealers' habits are not inducive to general support.

Most oil company officials assigned the responsibility of junking equipment desire that all material collected in the campaign be shipped directly to the steel mills. They want to know that their efforts are contributing directly to the war. The government argument that equipment salvaged and resold for further industrial use means that just so much new material need not be manufactured has not been accepted entirely by the oil companies.

Evidence that the junk-dealer practice of reselling salvable equipment reaching his yards as a contribution or sacrifice to the war's steel requirements is a major problem in the campaign is given in the resolution adopted by the Oklahoma general salvage committee headed by E. H. Moore, Tulsa independent producer. The resolution, adopted at a meeting of the executive committee earlier this month in Oklahoma City, Okla., declares:

Insure Against Improper Use

"It has come to the attention of members of the executive committee of the Oklahoma general salvage committee that materials acquired by dealers in scrap materials in previous war salvage collection drives, to a considerable extent, have been sorted and held apart for resale as used material for other than war purposes.

"Such activity is generally known to the public and is not approved by same.

"Such practice is having an adverse effect upon the efforts of all cooperating agencies to obtain additional scrap from the public for war production purposes.

"Therefore, it is the recommendation of the committee that the War Production Board take such steps as may be necessary to insure that all such materials obtained by scrap dealers through the general salvage effort be utilized solely for war production and that no portion thereof be held for resale as usable material."

Some oil companies are following through on their scrap collections to loading on cars to make certain that it is consigned to the steel mills in its entirety. However, under the system of collection, iron and steel scrap sold to junk dealers becomes their property and the source of material cannot legally or morally exercise jurisdiction over it after relinquishing title by sale. The urgency of collecting scrap, officials assert, is too urgent to justify the restrictive influence of compelling dealers to determine intent of the seller in each instance.

The displacement of new-material requirements by salvaged equipment is, in its broader sense, a highly desirable development, WPB officials have decided. Installation of used equipment where new machinery ordinarily would be used, the WPB Iron and Steel Branch contends, is an indirect contribution to the war that may conceivably be of greater benefit than the more direct procedure of converting the material into new products.

These arguments, however, have not quieted the insistence of most oil companies that their junk be scrapped and transferred as quickly as possible by dealers to the steel mills. Some companies are doing their own sorting and cutting of scrap metal in the field as one method of insuring that it will not be resold by dealers.

However, state directors of the scrap-collection campaign contend that there is only a modest profit for dealers, considering all phases of the program. It is admitted that oil-field and refinery equipment is among the most susceptible material to reconditioning and resale. Isolated experiences of oil companies who may find a junked flywheel from their yards offered for sale as used equipment are not necessarily representative.

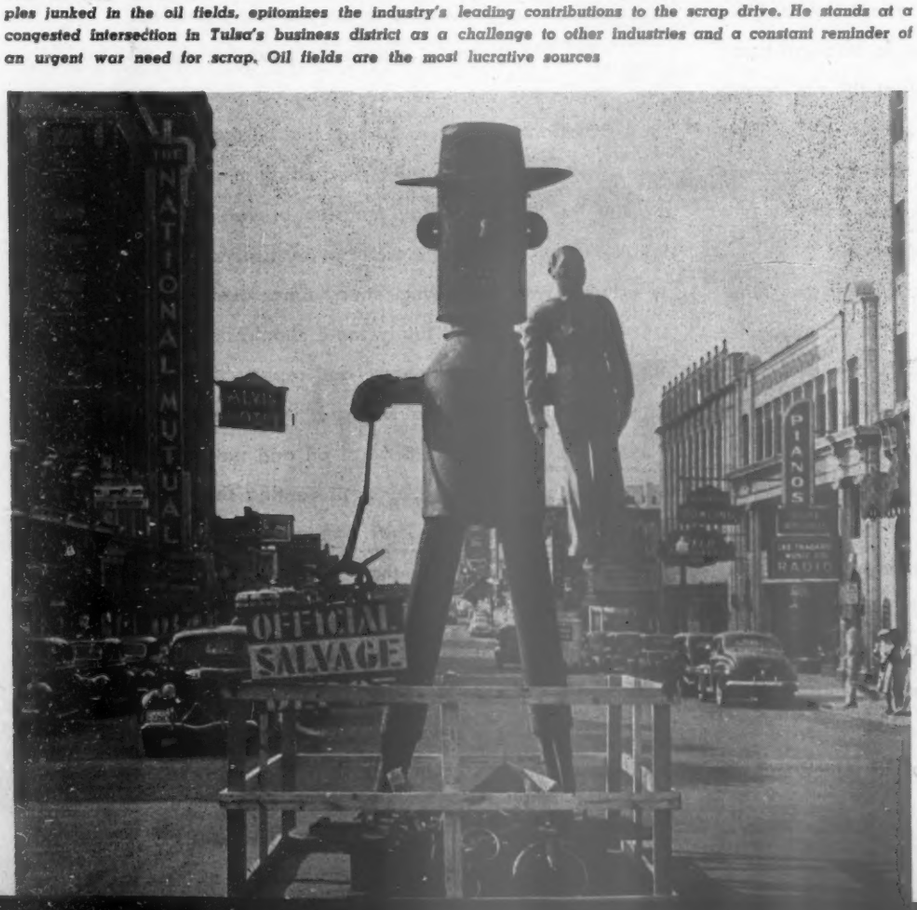
Organization Pattern

Most large oil companies have adopted the organization pattern of designating one or two men to cover each district and supervise the selection of material to be junked and develop a system for sorting and collection. Smaller companies have assigned responsibility for determining what equipment is to be junked to lease foremen or superintendents. Transportation of scrap to dealers' yards follows no general pattern. Some companies with sufficient scrap to justify the cost of transportation are making deliveries to the yards. Other companies are depending on the state and county salvage committees for delivering collections to dealer yards.

State salvage organizations include a Special Project Section under whose jurisdiction fall many of the petroleum industry's contributions. This section deals particularly with abandoned refinery facilities, steel bridges, tanks, pipe lines and other similar equipment.

The marketing phase of the oil-industry opera-

This "scrappy" monster, constructed entirely of old drilling bits, swivel wrenches, boiler plate, valves, and nipples junked in the oil fields, epitomizes the industry's leading contributions to the scrap drive. He stands at a congested intersection in Tulsa's business district as a challenge to other industries and a constant reminder of an urgent war need for scrap. Oil fields are the most lucrative sources



tions is currently receiving particular attention both by companies and scrap collectors. Rumors spread from Washington, D. C., last week that 20 to 30 per cent of the retail outlets may be closed by normal restraints on consumption. There is abundant evidence of this trend even in the Middle West, where restrictions on consumption have been confined to the ability to obtain tires. Underground storage tanks are being removed, pumps and hoists immobilized and other equipment rendered useless. Some of the equipment from closed stations will be used promptly in repairing and maintaining other retail outlets continued in operation.

Indication of what the oil industry is contributing to the scrap-metal program is given by developments in California where at least one company during the first 6 months this year delivered more than twice as much scrap as in all of 1941. Comparative figures for the oil industry as a whole are not available, but it is indicated that this increase is being paralleled by most other oil concerns.

In most states, the oil industry has contributed liberally to the personnel of directing committees and to other functions connected with the drive. In California, for example, the oil industry's part in the general drive is directed by a state committee composed of 24 topflight executives of companies and associations. Nine regional committees have been organized and three special groups for main divisions of the industry have been created to supervise the work.

Policies of the oil industry with respect to equipment have been almost diametrically reversed by the war. In peacetime, storekeepers had to show conclusively that materials were no longer usable before junking was authorized. Various operating departments are now instructed to prove that the used equipment they wish to retain in inventory is certain to be needed in a reasonably short time.

Conservation specialists in certain companies maintain direct contact with managers, plant superintendents, engineers and other members of salvage departments as well as working with government officials. Several conservation departments were functioning units before Pearl Harbor and the greater requirement for scrap since the United States entered the war has merely resulted in expansion of operations and a liberalization of company policy in determining what constitutes scrap. In instances where fully organized departments are a part of the company setup, cutting, grading and sorting of metals is completed before the material is routed through the junk dealers to the steel mills. This practice, in addition to assuring its ultimate delivery to steel mills, yields higher scrap prices for the company. Some departments are self-supporting.

Recap of Oil-Price Rulings Shows Trend of OPA Control

WASHINGTON, D. C.—A recapitulation of interpretations made by the Office of Price Administration in Price Schedule 88 covering ceiling prices on petroleum and petroleum products is included in a new manual called "Digests of Interpretations" just issued by OPA.

While the individual interpretations are subject to revision at any time, their compilation shows trends in official opinion. The section on No. 88, which became effective February 2, includes the following:

Applicability

Retail sales.—Sales made at retail service stations, garages and stores are expressly exempted from the schedule; sales made at other outlets, whether or not the sales are retail, are not within the exemption and hence are covered by the schedule. Thus a retail sale from a tank truck is subject to the schedule. 5-10-42.

Government agencies. — Government agencies are covered by the schedule. 5-10-42.

Specific commodities.—For commodities specifically mentioned in the schedule, see section 1340.-157 (a) and (b).

Aviation gasoline of 91-octane rating or higher or to certain components and mixtures, to the extent manufactured for and used in aviation gasoline of 91-octane rating or higher is not covered by the schedule. 5-10-42.

Heptane is covered by the schedule. 5-10-42.

Hexane is covered by the schedule. 5-10-42.

Octane is covered by the schedule. 5-10-42.

Petroleum ether is not included in the schedule. 5-10-42.

Propane is a petroleum product within section 1340.157 (b), which includes "all grades of gasoline including natural gases and blended naphthas, also special hydrocarbon fractions utilized in the manufacture of gasoline or the components thereof." 5-25-42.

Re-refined oil is subject to the schedule if the refined oil is subject to the schedule. 5-10-42.

Purchases from affiliated companies. — The schedule is applicable to the purchase of crude petroleum from affiliated companies and petroleum which accrues to royalty owners under leases owned by such affiliates. 5-10-42.

Price Determination

General.—The schedule establishes the following maximum prices:

(*a*) *Crude petroleum.*—Maximum price is established at the well and this price is the posted purchase price as of October 1, 1941. Provision is made for the following situations:

1. Purchase price pursuant to contract in effect on 10-1-41 in excess of posted purchase price.

2. More than one posted purchase price or no posted purchase price.

3. No actual production on October 1, 1941.

4. Shut-in well on October 1, 1941, and subsequently reopened or new well completed subsequent to October 1, 1941.

5. Crude petroleum purchased at points other than at the well.

(*b*) *Petroleum products.*—The maximum prices are quotation prices or if that cannot be determined the last sale price.

1. *Quotation prices.*—Maximum price is the lowest quoted price published in the October 2, 1941, issue of "Platt's Oilgram" and the "Chicago Journal of Commerce," the October 8, 1941, issue of "National Petroleum News," for a product of the same class, kind, type, condition and grade, except for the states of California, Oregon, Washington, Arizona and Nevada.

2. *Last sales price.*—Where the maximum price cannot be determined by quotation prices the maximum price for each seller is the price charged on the last sale of a substantial quantity of the same product to a purchaser of the same general class, within 60 days prior to October 15, 1941.

3. *Market price.* — Where the maximum price cannot be determined by quotation prices or by the last sale price, the maximum price is the market price prevailing at the given shipping or delivery point on October 1, 1941.

4. *Prior domestic contracts.*—Domestic contracts made prior to November 10, 1941, may be carried out at contract prices up to and including March 1, 1942.

5. *Prior export contracts.* — Export contracts made prior to January 20, 1942, may be carried out at contract prices up to and including March 1, 1942.

6. *Sales prior to March 1, 1942.*—Special provision is made for sales up to and including March 1, 1942.

(*c*) *Specific prices.*—Specific maximum prices are established for the following:

1. *Crude petroleum.*
   (i) Pennsylvania Grade.
   (ii) North and North Central Texas and Oklahoma.
   (iii) Louisiana.
   (iv) Oklahoma.
   (v) New Mexico.
   (vi) East Texas.
2. *Gasoline.*
   (i) Gulf Coast market.
   (ii) Eastern seaboard.
   (iii) Maryland and Virginia.
3. *Distillate fuel oils.*
4. *Lubricants.*
5. *Asphalts.*
6. *Residual fuel oils.*

Where less than maximum prices under the schedule are charged after the effective date of the schedule, such prices may be subsequently increased to the maximum prices established by the schedule. 5-10-42.

Renewal of contracts on month-to-month basis. Where a crude-oil purchase contract between two companies provides for payment of a price in excess of the posted price at the well and an identical contract was in effect on October 1, 1941, the contract calling for the price in effect on October 1, 1941, may be renewed on a month-to-month basis.

Sales from same pool upon cancellation of contract.—Where a contract in effect on October 1, 1941, to purchase crude petroleum at a price in excess of the posted purchase price for the pool in which the well is located, is cancelled, the producer may not make another contract at the same price with a different purchaser. Such a price may be charged only if the new contract is entered into between the same parties. 4-1-42.

Assignment of contract-payment of premium.—Where crude petroleum is sold under a contract in effect on October 1, 1941, and the purchaser subsequently assigns his rights under the contract, the assignee may not lawfully pay and the seller may not lawfully collect the premium in excess of the established maximum prices. The assignee of such a contract is essentially in the position of a new buyer. 5-10-42.

Well opened in pool after October 1, 1941.—Where on October 1, 1941, there was one posted price for crude petroleum produced from a particular pool and purchases were made on that date of crude petroleum under a contract at a price in excess of the posted purchase price, the maximum price for crude petroleum from a well opened in this pool after October 1, 1941, would be the posted purchase price. The provisions of

Section 1340.159 (a) (1) and (2) permitting prices in excess of the posted price to be charged under contracts in effect on October 1, 1941, are limited to production from wells which were producing wells on that date.

Pumping Fee Authorized

Effect of lesser differentials.—Where there was in existence on October 1, 1941, a differential between the price posted at the well and a particular delivery point, but certain sales prior to this date were made under a contract declaring lesser differentials, the higher differential may be charged for sales from the same wells at the same delivery point if that differential is not in excess of the maximum price established by this section. However, this does not preclude the establishment of a lesser differential. 5-10-42.

Fee for pumping into a gathering system.—The general trade practice of payment of a reasonable fee per barrel by pipe-line companies to oil-well operators for the latter's services in pumping oil into the pipe-line companies' gathering system does not violate the schedule, which establishes at-the-well prices for crude petroleum, even though such fee is charged in addition to the maximum prices. 5-10-42.

Comparison of specifications for classification.—Since classifications of petroleum products in the trade journals mentioned in Section 1340.159 (b) (1) are made on the basis of specifications, in order to determine whether a price quoted may be applicable to casinghead gasoline, for which there is no quoted price, the specifications should be submitted to determine whether it differs from natural gasoline, for which there is a quoted price. 5-10-42.

Price of small quantity not quoted.—Where the maximum price of petroleum products at a particular shipping or delivery point for a given classification of customer, at or for a given type of delivery of a small quantity, is not quoted in the trade journals referred to in Section 1340.159 (b) (1), paragraph (b) (2) of that section will be the basis for determining the applicable maximum price. 5-10-42.

Sales other than at the well.—In the sale of Pennsylvania Grade crude petroleum other than at the well, the seller's price is the specific price for crude petroleum established by Section 1340.159 (c) (1) and not the at-the-well prices provided for in Section 1340.159 (a). 5-10-42.

Blending of excepted products.—Where maximum prices have been established for a product which is to be blended with a product which is excepted by the schedule, the maximum price must be determined for the product without regard to the status of the other components. 5-10-42.

Roofing asphalt.—Each grade of roofing asphalt must sell at the same percentage differential over the prices of roofing flux as prevailed on January 1, 1941. For purposes of establishing differentials under the schedule, roofing asphalt in a container may be considered to be a distinct grade. If, on January 1, 1941, a seller sold flux at $9 per ton, Grade X roofing asphalt in bulk at $12 per ton, and Grade X roofing asphalt in containers at $15 per ton, the maximum prices now would be $10 per ton for flux, $13.33 per ton for Grade X roofing asphalt in bulk, and $16.70 for Grade X roofing asphalt in containers. 5-25-42.

Definitions

"*Posted purchase price.*"—The term "posted purchase price" as used in the schedule means, in accordance with the general understanding of the industry, a price publicly announced or published by an actual or prospective purchaser of crude petroleum as that which will be paid by him for crude petroleum of stated characteristics in stated areas under stated conditions, if and when he agrees to purchase such crude petroleum. 4-1-42.

Records and Reports

Filing of contracts of purchases.—In order to avoid unnecessary duplication, only purchasers of crude petroleum need file contracts of purchase under this section.

Farish Charges Case Against Standard 'Jerry-Built' House

WASHINGTON, D. C.—Another vigorous defense was entered here last week by W. S. Farish, president of Standard Oil Co. (New Jersey), to agreements made by his company with I. G. Farbenindustrie of Germany during the 14 years before the war. In reviewing details of the agreement, Mr. Farish charged that statements of witnesses before the Senate patents committee were based upon misinterpretation of contracts bolstered up by selected material from his company's files. He termed the case which witnesses tried to build against his company "a jerry-built house."

"It is my own conclusion from a full knowledge of actual operations under these agreements that the United States got far more from Germany than Germany ever received from us," Mr. Farish pointed out. "If we could have known that the Japs would strike Pearl Harbor on December 7, 1941, we would have been even more anxious than we were to sign those contracts to permit us to weave into the technical knowledge and experience of the industries of our country a large part of the technical advances of modern German science."

From catalytic chemistry, resulting from these agreements, has come a long list of the industrial miracles of our present war production, he said. The cooperative research between Standard and I. G. gave this country the first processes for producing 100-octane aviation gasoline and synthetic toluene, among other vital war products.

Standard's first contract with I. G. was made in 1927 when it took over a half interest in the oil-hydrogenation process in the United States only and Standard and I. G. agreed they would cooperate technically to improve oil-refining processes. Later this agreement was supplemented by an exchange of letters between the heads of the two companies, which, he said, was "a declaration of good faith, good intention, and a desire to settle questions in the spirit of the agreement."

"Fifteen years later," Mr. Farish said, "the antitrust division labeled this letter a 'coordination agreement' supposed to link together the several contracts of 1929 into an imaginary 'world cartel' for the oil and chemical industries."

Stating that the word "cartel" means to him "a combination of competitors to control production and fix prices," Mr. Farish said that he had read Thurman Arnold's explanation of what he means by a cartel and quoted Mr. Arnold as saying that "it inevitably pursues a policy of high cost and low turnover because short-run profits are always more attractive to a cartel than a struggle for competitive efficiency which comes of full production."

"Our relations with I. G. have never constituted a cartel under either of these definitions," Mr. Farish declared.

He said that his company's main 1929 agreement with I. G. was a "simple purchase" under which Standard bought for the world outside Germany full control of, and an 80 per cent financial interest in, all of I. G.'s oil and coal hydrogenation processes as well as their other inventions in oil refining.

"This straightforward purchase, widely hailed at the time in American newspapers, is the thing that is falsely labeled a world cartel for oil. How anyone could apply the term cartel to this 1929 purchase of German inventions is beyond our understanding," he said.

This main agreement was supplemented by two other agreements, he said. One of these permitted Standard to sell in Germany gasoline made there from coal. The other agreement bound Standard and I. G. not to enter the industrial field of the other.

Nation's Interest Advanced

"This agreement is the antitrust division's imaginary chemical cartel," Mr. Farish declared. "It is the foundation of the claim that we violated the antitrust laws of the United States. We were absolutely sure that the agreement would advance the interests of our nation, the American oil industry and our company, and we were advised by most competent counsel that it constituted no violation of the antitrust laws."

Mr. Farish told the committee that Asst. Atty. Gen. Patrick Gibson was "entirely wrong" when he said that Standard would not have had control of butyl rubber, under the terms of a 1930 agreement with I. G.

"Butyl rubber," he said, "has not been and cannot be made on a large scale except as part of an oil business. Furthermore, I. G. never even acquired a minority interest in butyl rubber in the United States, where its principal value will certainly always lie."

Mr. Farish charged that Special Atty. Irving Lipkowitz of the antitrust division painted a distorted picture of Standard's operations in acetic acid, acetylene, and acetaldehyde. His company and I. G. spent $1,500,000 on experiments designed to produce cheap acetylene, a missing link in the synthetic-rubber chain. He said that, whereas, Mr. Lipkowitz had charged Standard with preventing the full development and use of this process, the truth was that their agreement put an otherwise idle patent to work and started something, not stopped it.

"If I. G. had wanted to prevent the development and utilization of this process all it had to do was not to sign such a contract with us," Mr. Farish explained, adding that actually the process was found after costly experimentation to be worthless as far as producing acetylene or acetic acid on a commercially attractive basis was concerned.

He further refuted the previous testimony of John R. Jacobs, a special attorney in the antitrust division, who charged that Standard restrained the use of the methane-steam process and thus prevented our strategic explosive industry from obtaining necessary licenses under the patents to increase war production.

The methane-steam process, Mr. Farish explained, was used by his company to make hy-

drogen for oil hydrogenation. This same process is used also to make synthetic ammonia, but Standard had never owned the rights for such manufacture. When, however, the national-defense program indicated the need for synthetic-ammonia plants, Standard advised the Government of this situation. As a result, six large ammonia plants, built under government sponsorship and making about half the emergency ammonia to be produced in connection with the war effort, are using this process.

On synthetic rubber, Mr. Farish said that when the 230 documents interpreted to the Senate patents committee by Robert M. Hunter, special assistant to the attorney general, were considered on their merits, and apart from Mr. Hunter's interpretation, "they show a record of which we are proud."

Mr. Farish outlined the early development of buna rubber and said that the principal bottleneck to its commercial production in this country was butadiene. During 1939, he said, five leading rubber companies in this country were running tests on buna-rubber tires, using products which I.G. had supplied at Standard's request with the actual manufacture of tires carried out with the help of an expert from I. G. for this purpose. The only thing wrong with this picture, he pointed out, was that the process still belonged at that time to Germany, with Standard owning only a minority interest.

"Our solution of this situation was to eliminate I. G.'s interest in the buna process in the United States completely," Mr. Farish explained. "Before the end of September 1939 an agreement had been worked out under which we were to take over all of the rights in the buna-rubber process for the United States and the British and French empires and give up all our rights for the rest of the world. Within 1 month after Europe went to war, and more than 2 years before America went to war, we had eliminated all foreign interest in this process and were free to do with it whatever seemed necessary. If we had been gifted with foresight, if we had known that we would be at war with Germany in 1942, we could have taken no wiser step."

Once this had been done, Mr. Farish said that Standard reported the situation to the Army and Navy Munitions Board in November 1939 and asked for its advice, kept constantly in contact with appropriate government agencies, and followed their advice, began its own plans to produce buna rubber in the United States, and offered to license all the rubber companies it thought would be interested in producing buna rubber. Standard submitted samples of various synthetic rubbers on 46 occasions in the 2½ years before Pearl Harbor to seven different government agencies or their appointed representatives.

Mr. Farish said that it was not until the middle of 1941 that the Government itself did anything definite about buna-rubber production, and that not until Pearl Harbor did it act promptly to expand its rubber program.

"To expedite this, it wanted to get a complete pool of all patents and all information on buna rubber," he said. "We threw in all our improvement patents without royalty. A royalty of 1 per cent was allowed us for the basic patents for the period of the emergency. There was no question of preference of any kind to our company in the actual manufacture of the rubber or in any of the raw materials for it.

"While we ourselves are making only a small percentage of butadiene for the government program and absolutely none of the buna rubber itself, plant designs and detailed processes for buna rubber and for butadiene manufacture based on our engineering are being used widely throughout the rubber and oil industries under the information and patent pools which the Government initiated with the approval of the attorney general."

Mr. Farish said that "like all other American business men, our primary concern right now is meeting the demand of war emergencies for the production of miracles, demand for more and more production of better and better war weapons out of less and less plant equipment."

He said that to save time, material and lost motion in producing war materials the Government is urging complete technical cooperation on the part of industry, as a result of which his company is in a pool on buna rubber with the leading rubber companies. In butadiene, he said, it is in a pool of four chemical and four oil companies; in styrene manufacture in a pool of four chemical and two oil companies; in alkylation processes for 100-octane gasoline in a pool of six companies; in catalytic cracking and in toluene production pools are just now being set up in more effective form.

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Imports From Latin America Decline Nearly 65 Per Cent

By J. P. O'DONNELL

NEW YORK.—The effect of Nazi submarine activity in the western Atlantic, Caribbean and Gulf of Mexico on Western Hemisphere petroleum traffic is shown in the report of United States imports of petroleum products under the Venezuela trade agreement. The two most important sources of United States oil imports are Venezuela and the Netherlands West Indies, both of which are included in the agreement. In the first 7 months of 1941, United States imports of oil from these sources totaled only 13,549,547 bbl., or only 36.7 per cent of the total received from them in the same months of 1941.

United States imports from Venezuela in the first 7 months of this year total only 7,555,336 bbl. against 27,463,204 bbl. in the like 1941 period. This is a decline of 19,907,868 bbl. or approximately 72.5 per cent. In view of the fact that last year's imports by the United States directly represented about 20 per cent of Venezuela's total annual production, it is apparent that the drastic reduction in this traffic has been a severe blow to Latin America's principal producing country.

Venezuela Production Halved

Late in 1941 and in January this year Venezuela's production was in excess of 700,000 bbl. per day. Since then it has been more than halved. As a result of the decline in demand, exploitation drilling virtually ceased and operations were confined in the most part to exploration activities. These have resulted in several new discoveries in eastern Venezuela, the extent of which will not be known for some time. The effect on Venezuela's economy has been serious. A very large part of Venezuela's national funds is raised by petroleum taxation and loss of this revenue has necessitated borrowing, an unusual procedure for this country. Oil workers, Venezuela's most highly paid laboring class, have been laid off. Unskilled workers are being settled on farms in a joint oil company-government program.

United States imports from the Netherlands West Indies in the first 7 months of this year were 5,993,211 bbl., against 9,351,115 bbl. in the corresponding period of 1941, a decline of 3,357,904 bbl. or 35.9 per cent. The Aruba and Curacao refineries of Lago Petroleum and Royal Dutch-Shell process Venezuela crude oil almost exclusively.

In normal times practically all the United States imports from Venezuela and the Netherlands West Indies were consigned to East Coast ports. Therefore the curtailment of exports from the Caribbean area contributed to the distress conditions existing in OPC District 1. Statistics on imports by ports of entry have been discontinued but a brief resume of the September 1941 report, the last released by the Department of Commerce, reveals the magnitude and importance of these imports. In that month Venezuela sent 3,563,230 bbl. of crude and 402,859 bbl. of residual fuel oil; Curacao sent 1,297,817 bbl. of residual fuel oil, all for immediate consumption, to United States East Coast ports. In the same month, 10,703,000 bbl. of crude and 5,186,000 bbl. of residual fuel oil were brought here from the Gulf Coast. Therefore the Caribbean area, in so far as those products are concerned, supplied approximately 25 per cent of the East Coast receipts.

Under the Venezuela trade agreement, signed in November 1939, imports of crude oil and fuel oil up to 5 per cent of our total annual domestic refinery throughput of the previous year are allowed at a tax of 0.25 cent per gallon against the 0.5 cent tax that had been in effect previously and still applies to all imports in excess of quotas. This year, for the first time in the 3-year history of the agreement, it appears that Venezuela and the Netherlands West Indies, principal beneficiaries of the agreement, will fall far short of their quotas. To the end of July, this year, Venezuela had filled only 15.2 per cent of her quota in contrast to 60.3 per cent during the same time last year. The Netherlands West Indies, likewise, had filled but 39.9 per cent of quota against 67.8 per cent a year ago.

In direct contrast, however, is Columbia's status. Her quota for 1942 has already been filled, whereas at the end of July last year it was only 31.5 per cent occupied. Colombia's exports are reported to have declined substantially since the quota was filled, however. In the first 2 months of this year she exported 833,731 bbl. of oil to the United States and by that time had exhausted almost half of her quota under the agreement. Other countries, principally Mexico, also have filled their quota. It was almost half filled by the end of February by which time the United States had received 1,689,336 bbl. of a total allotment of 3,592,103 bbl.

The status of United States imports under the Venezuela trade agreement at the end of July, this year, compared with a year earlier, is given in the following table:

	1942		
Country—	Quota	Imports	Per cent filled
Venezuela	49,585,113	7,556,336	15.2
Neth. W. Indies	15,002,314	5,993,211	39.9
Colombia	2,253,860	(filled)	100.0
Other countries*	3,592,103	(filled)	100.0
	1941		
Venezuela	45,548,800	27,463,204	60.3
Neth. W. Indies	13,781,100	9,351,115	67.8
Colombia	2,070,400	652,985	31.5
Other countries*	3,299,700	(filled)	100.0

*Chiefly Mexico.

Recycling News

Many Texas Operations Converted to Recovery Of Low End-Point Aviation-Naphtha Fraction

CORPUS CHRISTI, Tex.—Several recycling plants in Texas and Louisiana have converted their operations to the manufacture of a naphtha fraction of approximately 70 gravity with 300 end point that can be raised to 87 octane with 4 cc. of tetraethyl lead. This type of material meets aviation-gasoline requirements.

Production of the aviation-gasoline blending stock from recycling plants was the salvation of certain operations because of inadequate transportation conditions and insufficient facilities to store the materials in less acute demand.

While many types of products are recovered from the various recycling plants at the present time, a survey indicates that a large number have adequate facilities for producing iso and normal butane in large quantities. Other plants are manufacturing a straight distillate type of product from 57 to 60-gravity, A.P.I., and still others are equipped to produce 400 end point motor gasoline and specification gasoline.

After start of the war, many recycling operators found themselves in the position of having high demand for their butanes but, owing to lack of transportation, particularly in South Texas, they were not able to dispose of their gasoline and kerosene production. Because storage was rapidly filling, the plants were facing curtailment of operation and, in many cases, shutdowns in the immediate future. This situation was ameliorated by conversion of operations to maximum recovery of the aviation-gasoline fraction.

Four such converted plants are located in the Agua Dulce and Stratton fields, two of which are owned and operated by the Chicago Corp., one by the Lockhart Oil Co., and one by Gulf Plains Corp. These four plants are producing approximately 5,000 bbl. daily of aviation gasoline base stock, thus alleviating the immediate aviation-gasoline shortage pending completion of many high-octane projects. These plants will deliver a large portion of the aviation-gasoline requirements of the adjacent area, thereby removing a portion of the strain on transportation.

Additions to the plants are being installed which will make possible the production of large quantities of butanes to meet requirements of the 100-octane program of the Great Southern Corp., which will be in operation in a few months. The Great Southern Corp. will not only supply a large quantity of the Army and Navy requirements for 100-octane fuel in South Texas, but will probably continue the production of 87-octane fuel by reforming the heavy naphtha, thus converting essentially all of the raw materials produced from recycling plants for military service.

In addition to the production of raw materials for 100-octane gasoline, recycling plants may also contribute to the manufacture of synthetic rubber by supplying the butane requirements for the "quick" butadiene program of several of the refineries entering into this phase of operations.

Natural Gasoline

Natural-Gasoline Manufacturers to Fill Larger Role in Synthetic-Rubber Program

WASHINGTON, D. C.—Natural-gas and natural-gasoline plants will have a much larger share in the synthetic-rubber program than appeared likely a few weeks ago, due to two new developments in the program.

One factor is that considerable quantities of butane will now be used to produce butadiene, whereas some 6 weeks ago the Rubber Reserve Co. announced that all butane processes had been abandoned and butylene would be the only charging stock used. Not only has the Rubber Reserve decided to reinstate some of the butane capacity, but the Office of Petroleum Coordinator is working with a number of natural-gasoline plants on plans to convert their equipment to produce butadiene from butane.

The other development is the conclusion that large quantities of furnace black will be required to make automobile tires from synthetic buna-S rubber. Buna tires require larger quantities of black than do natural-rubber tires, and the so-called furnace black has been found more desirable because it is coarser and greasier than carbon black and serves as a binder for the rubber.

Furnace black can be made from natural gas, from residue gas of natural-gasoline plants, or from distress petroleum liquids including distillate, kerosene, or even fuel oil. Furnace black can be produced at a rate of from 10 to 20 lb. per 1,000 cu. ft. of gas as compared with 1.25 lb. for carbon black.

The Natural Gas and Natural Gasoline Division of OPC is cooperating with companies seeking information and equipment for entering the production of furnace black.

●

Natural-Gasoline Production Increases to 219,000 Bbl. Daily

Daily average production of natural gasoline and allied products increased to 219,000 bbl. in June compared to 217,000 bbl. in May. Natural-gasoline output in June 1941 averaged 170,000 bbl. daily.

Output of liquefied petroleum gas continued to increase in June and was 50,946,000 gal., compared with 48,426,000 gal. in May, a daily average of 40,435 and 37,195 bbl., respectively.

The daily average production of natural gasoline and allied products for the first 6 months is 225,000 bbl., compared with 164,000 for the same period last year.

Production of liquefied refinery gas at petroleum refineries in June was reported by the Bureau of Mines to have totaled 21,042,000 gal., a daily average of 701,400 gal., compared to 703,161 gal., daily in May.

The most substantial increases in June production occurred in East Texas, Inland Louisiana and the Texas Panhandle districts.

Stocks of natural gasoline and other light products decreased slightly in June and at the end of that month were 273,714,000 gal., compared with 275,856,000 gal. on May 31.

PRODUCTION DATA

(Thousands of gallons)

	June 1942	May 1942	January-June 1942	January-June 1941
Appalachian	7,704	9,748	62,218	46,950
East Ohio	348	456	3,786	3,965
Other	7,356	9,292	58,432	42,985
Ill., Mich., Ky.	13,967	13,921	77,946	29,789
Oklahoma	36,466	36,527	218,568	185,084
Oklahoma City	5,480	4,799	32,872	34,901
Seminole	12,276	12,012	71,606	53,978
Rest of state	18,710	19,716	114,091	96,205
Kansas	5,275	5,994	39,186	36,225
Texas	124,665	126,925	783,849	538,664
Gulf	28,120	29,142	186,134	127,133
East Texas	24,042	23,122	136,437	83,493
Panhandle	33,742	33,712	209,790	140,567
Rest of state	38,761	40,949	251,488	187,471
Louisiana	23,798	23,313	142,687	57,198
Gulf	5,093	5,966	32,137	(*)
Inland	18,705	17,347	110,550	(*)
Arkansas	3,580	3,555	19,634	17,106
Rocky Mountain	9,993	10,085	61,344	48,359
New Mexico	6,845	6,863	41,451	29,272
Other	3,148	3,222	19,893	19,087
California	49,988	52,088	308,546	284,707
Kettleman Hills	9,738	11,378	66,570	57,241
Long Beach	7,017	7,506	43,736	44,197
Ventura Avenue	5,582	5,492	32,356	28,309
Rest of state	27,651	27,712	165,884	154,960
Total	275,436	282,156	1,713,978	1,244,082
Daily average	9,181	9,102	9,469	6,873
Total (thousands of bbl.	6,558	6,718	40,809	29,621
Daily average	219	217	225	164

*Not available.

Natural Gas

United Gas Authorized to Loop Lake Long Connection

WASHINGTON, D. C.—A certificate of public convenience and necessity was issued last week by the Federal Power Commission to the United Gas Pipe Line Co., Shreveport, La., for construction and operation of approximately 38 miles of 12¾-in. natural-gas pipe line in the nature of a loop of its facilities from the Lake Long field to a point near St. Rose, La., where it will connect with the company's Baton Rouge-New Orleans line.

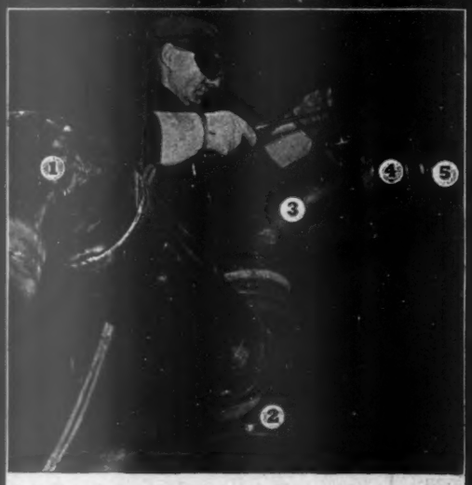
According to the application, United has received notice to increase its maximum daily delivery to New Orleans Public Service, Inc., from 86,000,000 to 135,000,000 cu. ft., and to Louisiana Power & Light Co. from 25,000,000 to 48,000,000 cu. ft. not later than December 15, 1942. It was stated that these increases in demands are made necessary by the war program, as well as the general development in the New Orleans area.

Utility-Company Gas Sales Show Increase of 11.6 Per Cent

NEW YORK.—Natural-gas sales amounted to 931,814,400,000 cu. ft. during the first 6 months, an increase of 11.6 per cent, the American Gas Association reported last week. Sales for industrial purposes increased 7.7 per cent, while sales for commercial consumption rose 17.3 per cent. Sales for domestic purposes were 13.9 per cent more than for the corresponding period of 1941.

Tube-Turn Welding Fittings are built to *stand the gaff* at the turns!

FASTER INSTALLATION WITH TUBE-TURN WELDING FITTINGS



In the above assembly, Tube-Turn welding fittings are speeding up the erection schedule and permitting a compactness of piping impossible if handled any other way. Also, their uniform wall thickness makes aligning and welding quicker and easier. Note the five Tube-Turn fittings in this small piping section: (1) a 90° elbow; (2) a tee; (3) another 90° elbow; (4) a lap joint welding nipple; (5) a lap joint flange.

It's tough enough to hang on the board when a speed boat is making sharp turns along a zig-zag course, but add the perilous sport of water jousting—and the *danger at the turns* is doubled!

Extra punishment occurs *at the turns* in industrial piping systems, too. That's why it is safer practice to *weld piping with Tube-Turn fittings.* Tube-Turn fittings provide maximum strength, prevent leakage permanently, and practically eliminate maintenance costs.

There's a Tube-Turn fitting for *every* pipe welding need—the right type, size and weight for every job. Insist on genuine Tube-Turn welding fittings for longer life in your piping.

Send for valuable data book and catalog.

TUBE TURNS, INC., LOUISVILLE, KY. *Branch offices:* New York, Chicago, Philadelphia, Pittsburgh, Cleveland, Tulsa, Houston, Los Angeles, Washington, D. C. *Distributors in all principal cities.*

TUBE-TURN TRADE MARK — The FIRST WELDING FITTINGS 1ST AND STILL THE BEST — *Welding Fittings*

Daily Quota of 4,066,500 Barrels Certified to Producing States

DAILY production of 4,066,500 bbl. of all petroleum liquids in September was certified last week by the Office of Petroleum Coordinator for War. Deducting the approximate production of 220,000 bbl. daily of natural gasoline and other light petroleum products leaves a crude-oil quota of about 3,846,500 bbl. per day. The August production quota of all petroleum liquids was 4,038,500 bbl.

The most significant change from the August 1 state quotas was in California where, as a result of the continually increasing military demands in the Pacific area, it was found necessary to raise the production rate to nearly 800,000 bbl. per day. However, the California production rate was actually increased as of August 16 and, consequently, the September quotas will cause no abrupt change from current operations.

California's crude-oil production for the week ended August 22 is estimated at 724,500 bbl. daily. The state produces about 40,000 bbl. of natural gasoline daily, lifting the indicated output to about 764,500 bbl. per day during the third week in August. Production has been lagging behind the OPC quota for several weeks, resulting in substantial withdrawals from storage.

The increase of 3,400 bbl. per day authorized in Kansas was the second most significant change. Increases of 2,200 bbl. per day in Louisiana, 1,100 in Texas and 800 bbl. daily in New Mexico were certified.

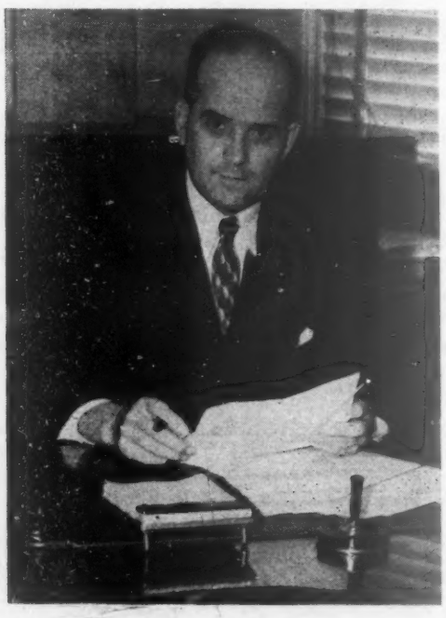
RECOMMENDED PRODUCTION RATES

(Barrels per day)

	Total petroleum liquids		
	Sept. 1942	Aug. 1942	Actual prod. Sept. 1941
District 1:			
New York	15,200	15,300	14,800
Pennsylvania	52,300	52,800	48,900
West Virginia	16,600	17,300	13,100
Total	84,100	85,400	76,800
District 2:			
Illinois	289,200	289,300	426,900
Indiana	19,300	20,600	17,700
Kansas	285,300	281,900	250,800
Kentucky	14,000	14,100	13,500
Michigan	66,700	66,800	51,700
Nebraska	3,900	4,100	5,500
Ohio	11,200	10,500	10,200
Oklahoma	415,300	415,500	462,700
Total	1,104,900	1,102,800	1,239,000
District 3:			
Arkansas	81,900	81,600	76,500
Louisiana	334,800	332,600	357,300
Mississippi	50,200	50,000	56,500
New Mexico	98,100	97,300	113,700
Texas	1,397,800	1,396,700	1,470,900
Total	1,962,800	1,958,200	2,054,900
District 4:			
Colorado	7,000	7,200	6,100
Montana	22,800	22,700	21,500
Wyoming	93,400	95,000	86,200
Total	123,200	124,900	113,800
District 5:			
California	791,500	767,200	685,500
Other	.....	.....	300
Total United States	4,066,500	4,038,500	4,170,300

Jordan Made Vice President Of Three Sinclair Companies

John W. Jordan of Tulsa last week was made a vice president of three producing companies in the Sinclair group. He was elected to the executive staffs of Sinclair Prairie Oil Co., Sinclair-Wyoming Oil Co., and Repollo Oil Co.



JOHN W. JORDAN

Mr. Jordan began his career with the Sinclair organization in June 1916 as a laborer in the pipeline gang at Drumright, Okla., working his way up as gager, tank strapper, pumper, roustabout, tool dresser, and gang pusher in various fields of Oklahoma, Kansas, and Texas.

During the first World War he served in the 57th Infantry of the U. S. Army.

In 1920, he was made production foreman at Homer, La. He was transferred to Wyoming in 1922 and, a year later, was advanced to district superintendent. From 1928 to 1931, he was district superintendent at Maud, Okla., and was then transferred to East Texas. In December 1935 he was advanced to the position of division superintendent with headquarters at Midland, Tex., of the newly created producing division consisting of West Texas, North Central Texas, Texas Panhandle, and New Mexico.

Early in 1938, he was called to the general office in Tulsa as executive assistant to W. L. Connelly, chairman of the board of Sinclair Prairie Oil Co., and in April 1941 was promoted to general superintendent of production which position he held at the time of his elevation to the vice presidency. Twenty-six years, more than half his life, have been spent in continuous service with the Sinclair companies.

Mr. Jordan was born in Olean, N. Y., on October 10, 1895, where he received his education in the public schools. He married Mary Daugherty in Independence, Kans., May 7, 1921. Mr. and Mrs. Jordan have four children, Marjorie, Kathryn, Helen, and John, Jr.

Will Work Labor Day; To Contribute Wages

Labor Day, September 7, will be a day of labor instead of a holiday for all employes of Hunt Tool Co., manufacturers of oil-field supplies at Houston, Tex. Not only will the workers put in a full day on their jobs, including the officers, but they have agreed to contribute their salaries and wages for that day to the Army and Navy relief organizations.

Thomas Hunt, company owner, said several thousand dollars is expected to be realized. The idea was originated by a company employe, quickly spread, and became so popular that practically 100 per cent of the workers have signed.

Oil Technologists Will Tell of Research at A.C.S. Meeting

Progress in petroleum research will be reported at a session of the Petroleum Division of the American Chemical Society to be held in Buffalo, N. Y., on September 10.

Production, refining and pure research will be dealt with by chemists from laboratories of leading oil companies and universities, according to the announcement by Dr. J. K. Roberts, director of research of Standard Oil Co. of Indiana, chairman of the division. Analytical methods, catalyst tests, physical data for engineering work, and chemicals from petroleum are among the fields discussed.

E. P. Ritterhausen and R. J. De Gray, of Socony-Vacuum Oil Co., Paulsboro, N. J., will present a paper on "Determination of Sucrose." These chemists have improved and adapted a standard colorimetric method of determining the concentration of sugar in water solution.

DEATHS

ROBERT FINNEGAN, 86, resident of Oil City, Pa., and vicinity for 70 years, died suddenly at his home near Oil City, death being attributed to natural causes. He was employed by Crystal Oil Works for many years, retiring several years ago. Three daughters survive.

FRANK CHADWICK WEST, 63, former vice president and general manager of Canadian Oil Companies, Petrolia, Ont., died at Toronto, Ont., recently. A native of Cleveland, Ohio, he served as chief accountant and traveling auditor of National Refining Co. before going to Canada in 1908.

A. R. SCOTT, 64, general superintendent of Reliance Oil Co. of Oklahoma, died Sunday at his home near Mounds, Okla. He had been ill a month. Mr. Scott was a native of Pennsylvania, but entered the oil business in Oklahoma 35 years ago when he moved to Bartlesville. His widow and a son survive.

W. R. McBRINE, 56, assistant manager of Commerce Oil Co., Houston, Tex., died last week at a Houston hospital. He was stricken suddenly at his home a short while before he died. He had been a resident of Houston for 16 years, and had been associated with Commerce Oil Co. for the past year. He formerly was employed by the Texas Railroad Commission. His widow and two sons survive.

FRED SANFORD BRADLEY, 58, landman for Ohio Oil Co., dropped dead at Falls City, Neb., as the result of a heart attack. He was a native of Kansas City, and went to Falls City last November from Red Oak, Iowa, where he had been previously stationed by his company. He is survived by his widow.

MARTIN R. HOFFMAN, 80, pioneer oil producer in western Pennsylvania, died recently. As a young man he entered actively into the production and refining ends of the oil business, and late in the 1890's he was associated with Kahle Brothers and Grey Oil Co., pioneering in the Sandy Lake oil field. His widow and a daughter survive.

ENGINEERING *and Operating* SECTION

▼

Weak Acid Gives Good Results In North Central Texas Wells

By HARRY F. SIMONS

This is the second of two articles, dealing with selecting the proper strength hydrochloric acid to use in oil wells. Recently the results obtained from using 20 per cent acid were discussed. This article deals with the use of 10 per cent acid in North Central Texas.

THE 15 per cent inhibited hydrochloric acid normally used in oil wells generally produces satisfactory results. If the wells do not respond as well as expected, indications are that another strength acid might produce greater benefits. The successful use of stronger acid in New Mexico and West Texas was discussed in a previous article; the effect of going in a reverse direction and using a weaker acid will be discussed here. The two together indicate it might be well to give more thought to the choice of acid strength.

The principal area for the application of weaker acid so far has been in North Central Texas, particularly in the wells produced from the K.M.A. "sand" of Pennsylvania age. This formation has an average calcium carbonate content of about 15.35 per cent. Most of these wells have been completed for a number of years, and the acid is being used for rejuvenation treatment.

When this work first got under way, the wells were treated with the regular 15 per cent inhibited hydrochloric acid. The results using this acid were not outstanding and the economic margin was quite narrow. In other words, the average increase in the well's recovery times the price per barrel was not a great deal more than the average cost of the acid.

A field experimental program was started by several operators to see if a more successful treatment could not be devised. After a short time it was found that the 10 per cent acid produced better results and that the economic margin was greater than in the case of 15 per cent acid.

The exact explanation for the better success of the weaker acid is not forthcoming, and its value can best be judged on the results. There are several factors which might contribute to the success of the 10 per cent acid. The weaker acid solution is less viscous and produces a less viscous spent acid. It is therefore less likely to emulsify. The weaker acid has a very good nonemulsifying characteristic and, as might be expected, has lower surface tension. However, nonemulsifying agents and surface-tension-reduction agents have been added to the weaker acid to increase these qualities. Another factor which may be important is the small amount of soluble material in the formation. The inhibition of the acid against steel corrosion is no problem.

Actually, there are few data on the results of the 15 per cent acid treatments to compare with the 10 per cent acid jobs. However, Table 1 shows the results of a number of wells treated with the weaker acid.

TABLE 1—RESULTS OBTAINED FROM USE OF DILUTE ACID

Well—	Acid Gallons	Per cent	Prod. (bbl.) Before	Prod. (bbl.) After
C. O. Davis 2 Jones	2,000	11	15	26
I. C. Harwell 1 Nooks	2,500	8	5	12
Hanlon-Buchanan 1 Denny	4,000	11	9	35
T. F. Hunter A-45 Waggoner	2,250	10	12	12
F. W. Merrick 2 Davis	4,000	10	5	14
F. W. Merrick 2 Davis†	6,000	10	14	14
F. W. Merrick 1 Davis	3,000	10	8	28
King Oil Co. 8 Waggoner	4,500	8	8	*24
Total			62	161

*Flowing. †Re-treated 6 months between treatments.

It should be noted that retreatment of the F. W. Merrick 2 Davis did not show any increase in production. This indicates that possibly the

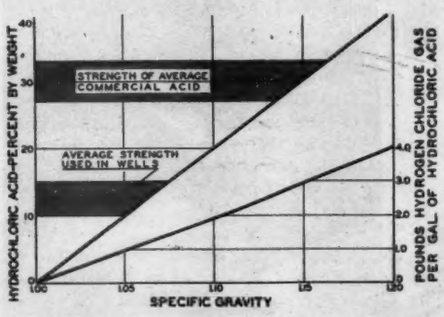

HYDROCHLORIC ACID-PERCENT BY WEIGHT
POUNDS HYDROGEN CHLORIDE GAS PER GAL. OF HYDROCHLORIC ACID
STRENGTH OF AVERAGE COMMERCIAL ACID
AVERAGE STRENGTH USED IN WELLS
SPECIFIC GRAVITY

Fig. 1—Specific gravity of acid solutions. In this figure the per cent by weight of hydrochloric acid and weight of hydrogen chloride gas per gallon of acid are plotted against the specific gravity of various solutions

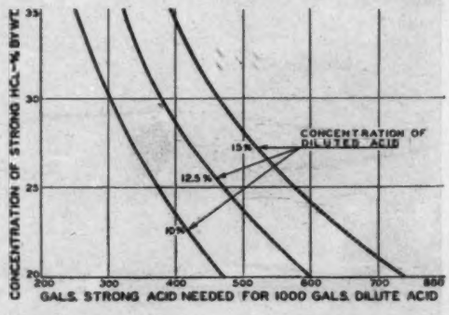


Fig. 2—Acid dilution chart. In this chart are given the quantities of concentrated hydrochloric acid required to produced 1,000 gal. of diluted acid of the concentrations usually used in acidizing treatments

best procedure in the area is to treat with only a moderate amount of the weaker acid in a single stage. Practically all of the wells in the area have been shot rather heavily so the contact area along the drainage channels is probably rather great.

All of the wells have held up very well after the weak acid treatments. This may be an indication that the acidization is as much a cleaning-up process as it is an opening-up one.

Wells in the area are all on the pump and are acidized with the tubing in the well. One method is to pull the rods and leave the standing valve in place and load the tubing with oil. The acid is then put in the casing and followed with oil from the stock tanks. The acid is left on the formation about an hour, after which it is pumped out through the tubing.

Another method is to fill the hole with oil and pull the standing valve. The acid is then put down through the tubing and allowed to stand on the formation approximately as before. In the meantime, the rods are run in the well, preparatory to pumping out the acid and load oil.

The dilution of concentrated hydrochloric acid and its proper inhibition to prevent corrosion of the metals with which it comes in contact is done at the treating station where the various chemicals, piping equipment and apparatus for mixing are readily available. The photograph illustrates typical station equipment. The tanks and drums containing the various chemicals are connected by means of a header to a measuring drum shown in the foreground. By opening the proper valve any desired chemical agent is allowed to enter the measuring tank. The sight glass on the side is calibrated in gallons. After the right amount of the chemical enters the drum the valve leading to the storage tank is closed and the chemical in the measuring tank forced into the well-treating truck tank by means of compressed air. The final treating mixture is also mixed by an agitation so as to secure a uniform concentration of the treating solution.

As the acid used in well treating arrives at the station in concentrated form it must be diluted to the field-treating concentration with water. The amount of strong acid required to make a definite volume of weaker acid can be determined by using a prepared curve, alignment chart or by calculating it from the formula:

$$\text{Vol. of strong acid} = \frac{\text{(vol. of weak acid) (\% of weak acid) (sp. gr. of weak acid)}}{\text{(\% of strong acid) (sp. gr. of strong acid)}}$$

For example, it is desired to make 500 gal. of 10 per cent acid from 18° B. (27.9 per cent by weight) acid. The specific gravity of the strong

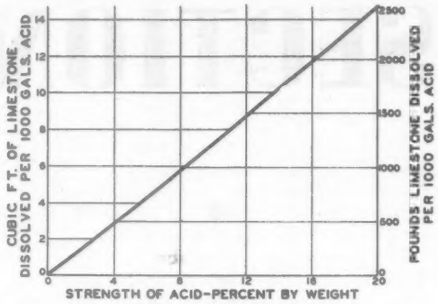


Fig. 3—Solution of limestone in acid. The quantity of limestone, in cubic feet and also in pounds, which will be dissolved by 1,000 gal. of hydrochloric acid of various strengths from 0 to 20 per cent, is shown here

acid is known to be 1.147 and the 10 per cent acid 1.050. Substituting these in the equation:

$$\text{Vol. of strong acid} = \frac{500 \times 10 \times 1.050}{1.147 \times 27.9}$$

The solution of this equation shows that 164.8 gal. of 27.9 per cent acid are required to make 500 gal. of 10 per cent acid.

As was pointed out above, the comparatively small amount of soluble material in the formation may be one of the contributing factors to the success of the weak acid treatment. The acid reacts with the calcium carbonate in the formation to produce water, carbon dioxide and calcium chloride. This opens the pores in the producing horizon by removing the soluble material.

As the amount of soluble material in the formation is reduced (the average calcium carbonate in the K.M.A. "sand" is 15.35 per cent), less acid is required to remove the material and open the pores in a given volume of the formation. In a case where the well is shot and the contact area quite great, penetration of the 10 per cent acid is sufficient to open drainage channels that are rather extensive. Fig. 3 shows that a little over 7 cu. ft. of pure limestone is dissolved by 1,000 gal. of the 10 per cent acid, which means that when the formation contains only 15.35 per cent calcium carbonate, 45.5 cu. ft. of the formation will react with the acid.

The problem thus becomes one of forcing the weak acid into the formation to contact the greatest volume of soluble material. The average treatment of 3,000 gal. of 10 per cent acid results in the removal of calcium carbonate from 136.5 cu. ft. of formation. The lack of complete success of the stronger acid may, in part, be due to a Jamin effect caused by its higher surface tension.

The field where the weaker acid is used is a gas-drive pool, and there is no danger of acidizing into water. The pay formation grades from a sand to sandy lime, with the wells in the better part of the field producing from an almost pure sand.

Equipment for diluting and mixing acid at chemical storage station

BOOKS

PROGRESS REPORT ON STANDARDS OF ALLOCATION OF OIL PRODUCTION WITHIN POOLS AND AMONG POOLS. American Petroleum Institute, New York City. $1.25.

This report was written and published by the special study committee and legal advisory committee of well spacing and allocation production of the Division of Production of the American Petroleum Institute, and is the most recent text on the theory of oil production in the United States. It contains the basic legal principles applicable to conservation of petroleum and a report of the legal advisory committee in addition to the portion on the technology of oil production. It also contains the report of the Interstate Oil Compact Engineering Committee.

In addition to the discussion of the concepts developed by the committee which prepared the report, the book contains useful bibliographies. These are Bibliography of Legal Phases of Allocation of Production, Well Spacing and Pooling of Contracts, and Bibliography of Engineering Phases of Conservation.

D. R. Knowlton, director of production for OPC, was chairman of the special study committee on well spacing and allocation of production; Guy H. Woodward, Stanolind Oil & Gas Co., Tulsa, was chairman of the special legal advisory committee, and E. DeGolyer, assistant petroleum coordinator, was chairman of the Interstate Oil Compact Engineering Committee.

METHODS FOR DETERMINING PERMEABILITY OF WATER-BEARING MATERIALS WITH SPECIAL REFERENCE TO DISCHARGING-WELL METHODS, Geological Survey Water-Supply Paper 887. By L. K. Wenzel. Published by U. S. Department of Interior. 190 pp. Paper bound. Price $0.60.

This report outlines the general methods for determining permeability and includes some of the more widely used variations of each. It includes a bibliography of literature on permeability and laminar flow and a list of organizations in the United States that make permeability tests. While dealing specifically with ground waters, much of the data should be of interest to men in the oil-producing business.

The *HALOGENATION* of Aliphatic Hydrocarbons (Part 2)

By GUSTAV EGLOFF and M. ALEXANDER
Universal Oil Products Co.

This article is the second of a series devoted to discussing the halogenation of straight-chain hydrocarbons. The first appeared August 20 starting on Page 41. Immediately following this portion of the series the oxidation and then the nitration of these hydrocarbons will be discussed. The complete compilation represents the most authoritative, modern summary of the chemical reactions and possible commercial applications of petroleum chemistry available in convenient printed form.

3. Halogen Substitution and Addition of Alkenes

With the exception of chlorine substitution on isobutene discovered by Sheshukov[49] and on trimethylethylene by Kondakov,[50] only additions have been considered as the reactions between alkenes and halogens until recently when it was found that substitution is a type of reaction exhibited by alkenes. The phase and temperature favoring substitutions vary with the specific alkene. Although most alkene substitutions may be classified as thermal, some take place at moderate temperatures. For the latter class, there is evidence favoring "induced" substitution, a type of reaction encountered with alkenes.

The unsaturated carbons of alkenes add halogen atoms from the molecular halogens, hydrogen halides, and other compounds containing a reactive halogen atom. In general, addition is accelerated by elevated temperatures, the action of light, and metallic catalysts, but these factors are not necessary in all cases for initiation of the reaction. Temperature conditions vary with the reactants used. Substitution complicates the reaction of halogens at elevated temperatures. Solvents influence the reaction rate but specific effects vary considerably with the hydrocarbon and halogenating agent used. In some cases, solvents seem to determine the isomeric form produced. Addition of hydrogen halides normally follows Markownikoff's rule that the halogen atom goes to the unsaturated carbon atom bearing the least hydrogens. There are, however, exceptions and attempts have been made to explain abnormal orientations resulting from peroxides and solvents.

A. Halogen Substitutions of Alkenes

The substitution of halogen into alkenes compares with the halogenation of alkanes. Thermal and "induced" substitutions are common to both. Similar mechanisms seem to explain their respective courses of reaction.

Induced substitutions may be classed as autocatalytic for alkenes, in that a mixture with chlorine produces an intermediate which catalyzes the reaction. However, this intermediate is also a catalyst in non-autocatalytic substitutions such as chlorine into benzene[51] and chlorine into pentane.[52] Chlorine and 2-pentene, dissolved separately in carbon tetrachloride and mixed, react to yield 1-chloro-2-pentene and the addition product.[53] Substitution was observed in similar reactions with 1-pentene, 2-hexene, 1-, 2-, and 3-heptene but the products were not identified.[53] The data presented support the conclusion that when alkene activity is moderately large, differences in this activity do not greatly affect the ratio of addition to substitution, but that a high per cent of substitution is found with unusually active alkenes. Chlorine does not combine with ethene in the gaseous phase at moderate temperatures, but if reaction is initiated by light, it will proceed in the dark at 25° with about 40 per cent substitution products.[54] Although in the liquid phase chlorine reacted with ethene, propene, and 1- and 2-butene by substitution, these substitutions took place on the chlorinated alkene rather than on the alkene itself. A small quantity of chlorobutenes was found but, unlike induced substitution products, the amount was not lowered by the presence of oxygen. 2-Methylpropene at 70° yields about 74 per cent 2-methyl-3-chloro-1-propene. Since this yield is not affected by oxygen, the investigators concluded that it is not an induced substitution and that induced substitutions take place on halogen addition products and alkenes only. While 2-methylpropene preferentially substitute chlorine in the liquid phase, some addition occurs[55] in the vapor phase. Pentenes having a tertiary carbon atom likewise yield a very high percentage of chloropentenes,[56] and with bromine and a tertiary pentene, substitution reactions could not be eliminated.[57] The substitution reaction seems to be characteristic of tertiary alkenes. It is questionable whether the formation of 1-chloro-2-pentene from 2-pentene is an induced substitution or a substitution depending on the specific character of 2-pentene. Stewart and Weidenbaum compare the results of this reaction with the chlorine substitution of pentene as induced by an ethene-chlorine mixture.[58] They found that the effect of excess alkene over chlorine was of the same order of magnitude in both reactions. A chain mechanism accounting for both substitution and addition products was proposed. This mechanism is initiated thermally and propagated by an intermediate, $C_5H_{10}Cl$:

$$Cl_2 \rightarrow 2\ Cl \text{ (thermally)}$$

$$C_5H_{10} + Cl \rightarrow C_5H_{10}Cl$$

$$Cl_2 + C_5H_{10}Cl \rightarrow C_5H_{10}Cl_2 \rightarrow C_5H_{10}Cl_2 + Cl \text{ etc.}$$

$$C_5H_{10} + C_5H_{10}Cl \rightarrow C_5H_9 + C_5H_{10} + HCl$$

$$C_5H_9 + Cl_2 \rightarrow C_5H_9Cl + Cl \text{ etc.}^{59}$$

Substitution of alkenes at high temperatures is in many respects comparable to thermal substitution of alkanes. Chlorination of the ethane-ethene mixture shows, however, that the reaction rate with the alkene is much slower than with alkane.[3] The presence of the alkene also has been shown to hinder the total chlorine substitution of the mixture.[55] The presence of other alkenes, especially propene, also inhibits substitution in ethene, while some substitution preferentially occurs on the saturated carbons of the alkene inhibitor. The substitution reaction takes place exclusively above a critical temperature range while the reaction below this range is addition. The temperature range varies with each hydrocarbon.[60]

Alkene—	Critical temperature range °C.
2-Pentene	125-200
2-Butene	150-225
Propene	200-350
Ethene	250-350

2-Methylpropene in the liquid phase does not give the addition reaction even below —40°, and it possibly does not have a critical chlorination temperature.[60] Bromine substitution differs somewhat from the chlorine reaction. At high temperatures bromine substitution is greater than that of chlorine, but near the lower limit of the critical range, bromine substitution scarcely occurs. The effects of the two halogens may be explained by the relatively greater dissociation of bromine at the elevated temperature. The temperature ranges of the various hydrocarbons indicate that ease of substitution is least in hydrocarbons having two primary carbon atoms on the double bond, increases when the hydrocarbon has one secondary atom on the double linkage, becomes even greater with two secondary atoms on the double bond, and substitution is predominant when the hydrocarbon has an unsaturated tertiary atom. Substitution is favored by a high hydrocarbon-chlorine ratio, but over certain temperatures an appreciable change in this ratio does not noticeably alter the substitution-addition ratio. With temperature elevation the substitution products are composed of increasing amounts of monochloroalkenes over substituted addition products. It appears that substitution proceeds more readily to yield allyl type products than the vinyl type. The production of allyl type products falls in line with the proven greater ease of alkane substitution over alkene substitution. With propene, 3-chloro-1-propene is formed almost to the exclusion of other isomers[58] and with isobutene, 3-chloro-2-methyl-1-propene predominates over the vinyl type isomer.[59]

Both substitution and addition of chlorine by alkenes at high temperatures seem to occur largely by radical chain mechanisms, but reactions at surfaces and gas-phase bimolecular associations and metathesis probably also enter in the total reaction.[60] Surface effects give some evidence of both bimolecular association and chain initiation. Inhibition by small amounts of oxygen does not persist to as high temperatures with the alkenes as with alkanes. Above certain temperatures

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which vary somewhat with the alkene used, small amounts of oxygen actually catalyze the total chlorination, increase the per cent substitution, and almost totally suppress addition. The presence of alkanes inhibits the oxygen catalyzed substitution. High concentrations of oxygen, however, give the anticipated inhibitory effect on substitution. Catalysis by oxygen is better explained by chain initiation through radicals from the interaction of alkene and oxygen than by reaction of an association complex with chlorine. The radical chain is further established by the positive catalysis of a free radical forming compound, tetraethyl lead. The critical temperature range of change from addition to substitution is lowered considerably by the presence of tetraethyl lead. Some evidence supports other mechanisms. The promotion of addition by a glass wall in the presence of oxygen indicates an association reaction on the surface. At high temperatures there is an addition reaction insuppressible by oxygen and unaffected by surface which is best accounted for by a gas-phase bimolecular association. As with the alkenes, gas-phase bimolecular metathesis also seems to occur. The actual products formed are explainable by either chain mechanism or bimolecular theories. Calculations based on activation energies slightly favor chain mechanisms over bimolecular processes.[59] A vast amount of experimental evidence favors the chain mechanism but at higher temperatures there are undoubtedly some bimolecular processes.

B. Addition of Halogen to Alkenes

Alkenes form addition products with all of the halogens. The preparation of chlorine and bromine derivatives is more successful than the preparation of the fluorine and iodine compounds because the fluorine reaction tends to be explosive and the iodine derivatives are unstable.

The fluorine reaction is highly explosive and must be modified considerably to obtain any difluoro derivative of the alkene. Polymerization occurs with ease and may be attributed to the formation of hydrogen fluoride which is a powerful condensing agent.[21 60] A small yield of difluorohexadecane was obtained from reaction at 15° of 1-hexadecene, dissolved in carbon tetrachloride, with fluorine diluted with carbon dioxide. This alkene produced a much lower yield of fluorine derivative than the corresponding alkane under identical conditions.[21]

Difluorides may be prepared more readily by an indirect method. 1,1-dichloroethane, 1,1-dichloropropane, 1,1-dichlorobutane, and 1,1-dichloroheptane reacted with a mixture of mercuric oxide and hydrogen fluoride to give the corresponding 1,1-difluoro compounds.[46] 2,2-Difluoro compounds are prepared by reaction of antimony fluoride with the 2,2-dichloro compound. Unsaturated fluorine derivatives are formed from saturated fluorochloro compounds by removal of two chlorine atoms with zinc and alcohol.[61 62 63]

Addition of chlorine to alkenes takes place with comparative ease. Such factors as solvents, surfaces, and temperature influence the reaction. Reactivity seems to increase with the size of the alkene molecule.[64] The preparation of dichloroethane has received considerable attention while preparation of its homologues, many of which are readily prepared, have not been the subject of much research.[65] A study has been made on pure ethene and chlorine gases reacting at 20° in the absence of light. The reaction was complicated by substitution which produced trichloroethane.[66 67] Better yields of dichloride[67] were obtained at —20° to —30°. Oxygen slowed down the total reaction rate and tended to eliminate substitution.[66] An induction period was observed which was terminated by the formation of a liquid film on the wall of the reactor, and the reaction proceeded rapidly from this point. These observations indicate an autocatalytic reaction involving chain mechanism. Stewart and Smith[66] postulate an activated liquid complex of dichloroethane as the intermediate which catalyzes addition. They also attribute the substitution leading to trichloroethane to a chain reaction propagated by this complex. Deactivation of this complex, with the liberation of gaseous dichloroethane and heat, is probably accomplished by oxygen and hence the observed reduction of reaction rate followed. The addition of chlorine to 1- and 2-pentene at —5° yielded dichlorides and only about 1 per cent unsaturated monochlorides.[69] 3-Hexene in carbon tetrachloride reacted with chlorine between —30° and —40° to give a higher yield of 3,4-dichlorohexane than was obtained with other chlorinating agents.[70] Normal addition has been observed on tertiary carbon atoms at the double bond but the substitution reaction predominates.[66 71 72] The solvent used is an important factor in alkene reactions. Many substances commonly used as such form addition compounds with alkenes. Although alkanes, as solvents, do not react with ethene, they may interfere with ethene-chlorine addition since alkane substitution is induced by the reactants.[21]

Bromine and alkenes undergo a reaction similar to that observed with chlorine. The uncatalyzed addition of bromine to ethene at 16° in the absence of light is a surface reaction and simple addition results unless bromine is present in excess so that supplementary reactions are induced. The velocity of the reaction decreases with rising temperature.[73] The negative temperature coefficient persisted with propene but temperature changes had little effect with 2-methyl-2-butene.[74] Velocity increases with increased initial bromine pressure but is not influenced by initial ethene pressure.[73 74] Moisture accelerates this reaction probably by surface action rather than by effect on the reacting substances in the bulk phase.[75] Evidence indicates a chain reaction starting on the glass surface and spreading into the gaseous phase. This evidence includes the induced reaction observed in presence of excess bromine, acceleration by increased glass surface area, inhibition by packing with "poisoned" glass tubing, and inhibition by gases capable of deactivating chain carriers. Unlike the ethene-chlorine reaction observed by Stewart and Smith the bromine reaction was retarded by the formation of liquid dihaloethane. Liquid phase bromine-alkene additions seem to follow different courses. The ethene-bromine addition in carbon tetrachloride seems to be an autocatalytic reaction brought about by hydrogen bromide formed in preliminary substitution.[76] Davis, however, suggested a bromine-hydrate theory.[74] Ingold and coworkers explain bromine addition on the basis of relative electronic tenacity in accordance with their results that show bromine addition increasingly enhanced by each methyl substituent on an unsaturated carbon atom.[77 78 79] Ogg objected to this postulate of an intermediate carbonium ion,[80] $RCHBr—C^+HR$, which is unstable and would lead to identical products from cis and trans isomers. A mechanism involving an intermediate carbanion which is relatively stable and thus leads to the observed cis and trans products was proposed:[81]

1. $Br^- + RCH = CHR \rightarrow RCHBr — C^-HR$
2. $RCHBr — C^-HR + Br — Br \rightarrow RCHBr — CBrHR + Br^-$

Iodine forms less stable compounds with alkenes than do the other halogens. In the gaseous phase, diiodoethane undergoes homogeneous decomposition which may be accelerated by iodide ions.[82 83] Equilibrium studies show the heat of dissociation of diiodoethane to be 13.4 ± 0.5 k. cal.[84] The reaction of ethene gas with iodine was reported probably to take place on the surface of solid iodine.[85] The velocity of this addition was much greater than that of the homogeneous reaction in carbon tetrachloride. With iodine, as was observed in the case of bromine, velocity of addition is enhanced by the presence of methyl groups on the unsaturated carbon atoms.[85]

C. Addition of Hydrogen Halides to Alkenes

The alkenes add halogen acids in the order: HI > HBr > HCl > HF. Addition takes place more readily with propene than ethene and even more readily with butenes and higher homologues. With some exceptions which have been attributed to intramolecular rearrangements, properties peculiar to a specific compound, and effects of peroxides, solvents, and catalysts, orientation follows the Markownikoff rule.

Addition of hydrogen fluoride to alkenes has been accomplished. Since activation energy calculations show that less energy is required for the cleavage of the carbon-carbon bond than for the addition of hydrogen fluoride to ethene,[86] it is somewhat surprising to find that the reaction takes place. Grosse and Linn prepared ethyl, isopropyl, tert-butyl, and tert-pentyl fluorides by uncatalyzed addition of hydrogen fluoride to the alkene.[87] The reaction was not affected by boron fluoride nor by steel, nickel, copper, or "paraffin" vessels. Anhydrous hydrogen fluoride was used in the successful preparations, but a 50 per cent hydrogen fluoride solution did not react. The optimum temperature and pressure conditions varied with the alkene. Ethene under 10 atm. pressure showed an increase in yield with rising temperature. Propene under 3 atm. showed an opposite effect. Contact time did not affect the ethene reaction and affected the propene reaction only as polymers were formed. All fluorides are converted into polymeric form by excess hydrogen fluoride.

Ethyl chloride may be formed by addition of hydrogen chloride to ethene at temperatures suf-

(Continued on Page 48)

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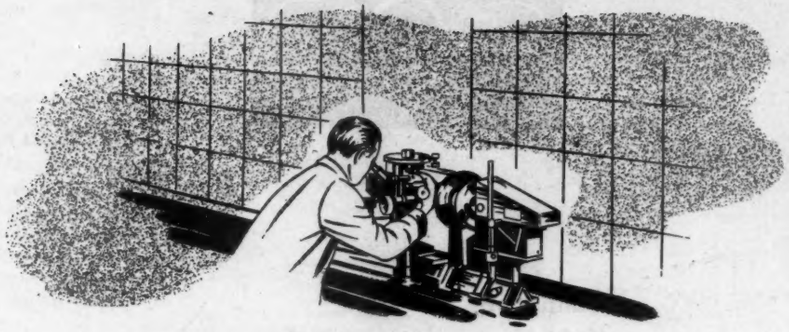
FOR INFORMATION ON TUBES FOR TURNING OIL INTO RUBBER



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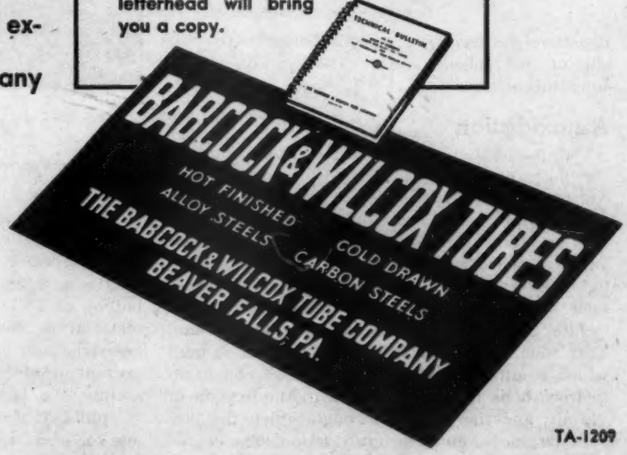

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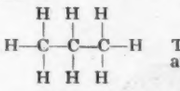
GLOSSARY of terms used in PETROLEUM CHEMISTRY

Alkane

Any hydrocarbon of the methane series. These are also aliphatic hydrocarbons because they meet the requirement of being open chain and saturated as

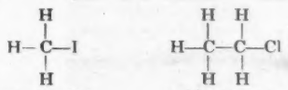


This is an aliphatic or an alkane hydrocarbon

propane

Alkyl Halide

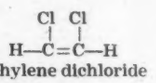
Any hydrocarbon of the methane group containing a halogen atom as methyl iodide or ethyl chloride.



methyl iodide ethyl chloride

Alkene

Any hydrocarbon of the ethylene series. An olefin as

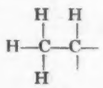


ethylene dichloride

Bimolecular reactions take place when an alkene is halogenated. The chain mechanism of addition is believed followed. The alkadiene and alkenynes usually form 1,4 addition products rather than simple products as in the case of alkenes.

Alkylidene

Any bivalent aliphatic hydrocarbon radical having both free valences attached to the same carbon atom, as ethylidene

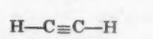


Alken-yne

A hydrocarbon of the aliphatic series which contains a double and a triple bond between carbon atoms.

Alkyne

Any member of the acetylene series and which is indicated by a triple bond between carbon atoms.



Acetylene

Reactions of members of this series with any one of the halogens involve both addition and substitution.

Autoxidation

The production of increasing proportions of thermally cracked gasoline to gain octane value has caused the production of greater quantities of unsaturated hydrocarbons. These inherently tend to react chemically with oxygen of the air and are especially reactive when exposed to sunlight. Everyone is familiar with the brown film seen on the filling-station display bowl after "white" gasoline had been standing to the sun. That film has been identified as a resin or gum which results from the chemical union of certain hydrocarbons in the gasoline with the oxygen of the air, and the process through which the gasoline passes is known as autoxidation. The degree of autoxidation has been found closely associated with the quantity of organic acids formed.

Azeotrope

A liquid mixture that shows a maximum or a minimum boiling point. It implies the ability of one liquid to be mixed with another or several liquids to form a solution which boils at a constant temperature.

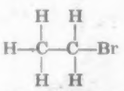
Bivalent

An atom which has a valence of two. It has the capacity to react chemically with two univalent atoms such as when oxygen, which is bivalent, joins with two atoms of hydrogen to form water as—

$$\underset{\text{hydrogen}}{2(H)} + \underset{\text{oxygen}}{(O)} = \underset{\text{water}}{H_2O}$$

Bromination

The addition of the element bromine in a chemical reaction is called bromination. Bromine is one of the four halogens and is often referred to as such. All react readily with hydrocarbons.



ethyl bromide

Carbonaceous

Any material which contains free carbon is classified as carbonaceous. The term covers most black sedimentary rocks such as shale and limestone.

Catalyst

A material which influences a chemical reaction but which remains unchanged itself or returns in place to its original composition is known as a catalyst. Many elements or compounds have this ability and they permit the chemist to carry out reactions with less heat, less time or less refrigeration and without apparent loss to their own volume. Actually, there is some loss of potency in the catalysts used in catalytic refining, but their usefulness in preparing high-octane aviation fuels, etc., is proved.

Clorination

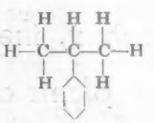
The addition of the element chlorine in a chemical reaction is called chlorination. The commercial chlorination of aliphatic hydrocarbons has become a common practice. The subject is briefly described on Page 46 of the issue of August 20.

Coke

Petroleum coke is formed when oil is cracked. Relatively high temperatures produce more coke as a result of breaking down or dissociating the hydrocarbon molecules to a greater extent. Obviously cracking temperatures, time of reactions and pressure conditions are chosen to avoid much of this. Petroleum coke has a wide range of impurities and properties, depending upon the source and nature of the oil charged and the procedure and equipment in which it is processed.

Cumene

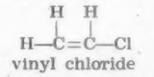
This is isopropyl benzene with the formula:



VINYL CHLORIDE

One of the important products of petroleum chemistry promises to be vinyl chloride because of its unique solvent properties and because it may be further processed to make other important articles of trade. It is a water-white liquid, lighter in weight than water (0.9121 sp. gr.) and boiling at 7° F. at a pressure of 760 mm. This material is now produced by the reaction of acetylene and hydrogen chloride. An equally important product of this general type is vinyl acetate, the latter being more reactive. It must be inhibited if it is to be shipped or held in storage for even a few days.

The material is sometimes called chloroethylene to explain better its chemical structure



vinyl chloride

The union of acetylene and hydrogen chloride may be shown as a simple chemical reaction on paper, as $H-C\equiv C-H + HCl \rightarrow H-\underset{H}{\overset{H}{C}}=\underset{Cl}{C}-Cl$.

However, in practice the procedure is not this simple because of the highly reactive nature of the triple bond and the formation of more complex polymers and multichlorine molecules.

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QUESTIONS ON TECHNOLOGY

By W. L. NELSON, Technical Editor

W. L. NELSON

This department of The Oil and Gas Journal is devoted to the manufacturing branches of the oil industry.

Those connected with the refining of crude petroleum, the manufacture of natural gasoline and closely allied industries are invited to submit their problems to W. L. Nelson, technical editor. The department was created for the purpose of aiding managers, superintendents, engineers, chemists, and all those engaged in the various phases of plant operation; also those connected with the marketing and utilization of petroleum products.

Questions should be submitted in as much detail as possible. Inquiries must be signed but only the given initials will be printed. The source of the question is considered to be confidential.

Questions requiring a discussion of patents, extended computations, or a detailed study cannot be considered. When the matter is of general interest, a reply will be published within a reasonable time.

Glycerin—Indirect Product Of Petroleum

We have several hundred barrels production of a Mid-Continent crude oil and would like to make glycerin from it. We would like to know how to go about this.—J. R. V.

The production of glycerin from propylene gas was answered on Page 89 of the February 27, 1941, issue of The Oil and Gas Journal in answer to a question almost identical to the one stated here. A flow diagram and the chemical reactions are given in the above reference.

It must be emphasized again that glycerin is not made directly from petroleum but from propylene gas, which in turn can be made from the propane found in natural gas in small amounts (or in even smaller amounts in crude oil), or which can be extracted in small amounts from the cracking-still gases that are produced in most refineries. Inasmuch as the operations of producing glycerin from propylene via the following chemical products were discussed somewhat completely in the February 27, 1941, issue of this page, it appears wise to clarify at this time the various methods by which propylene can be procured from petroleum:

1. Propylene plus chlorine gives alkyl chloride.
2. Alkyl chloride plus sodium hydroxide gives alkyl alcohol.
3. Alkyl alcohol plus hypochlorous acid gives monochlorohydrin.
4. Monochlorohydrin plus sodium hydroxide and carbonate gives glycerin.

Propane occurs in natural gas and may be absorbed in gasoline plants along with natural gasoline, but it must be dehydrogenated by an expensive thermal or catalytic operation to produce propylene. Propylene does occur naturally in the gases from thermal or catalytic cracking plants but the yield is small and it must be separated by fractionation and scrubbing (chemical reaction) from the large number of other hydrocarbons that are associated with it in cracking-still gases. Thus, glycerin is only indirectly a product of petroleum, being producible from one of the many hydrocarbons that are present in petroleum by a somewhat elaborate processing operation. In general, the manufacturing of glycerin would be accomplished by one of the following general processing schemes:

A. From natural gas (or saturated refinery gas).

1. Absorption of gases in lean oil.
2. Stripping of hydrocarbons from oil.
3. Fractionation to produce a propane cut (perhaps 8 per cent of the original natural gas).
4. Dehydrogenation of propane.
5. Fractionation to obtain propane and propylene.
6. Absorption of propylene by a chemical solution.
7. Recovery of propylene from chemical (perhaps 3 per cent of original gas).
8. Glycerin from propylene as outlined above.

B. From crude oil.

1. Topping of crude oil for gas oil and/or topped crude oil (perhaps 50 per cent).
2. Thermal or catalytic cracking of gas oil producing gas (perhaps 5 per cent of crude oil).
3. Absorption, stripping and fractionation as in 1, 2, and 5 above for mixed propane cut.
4. Absorption of propylene by a chemical solution.
5. Recovery of propylene from chemical (perhaps 0.4 per cent of crude oil).
6. Glycerin from propylene as outlined above.

The yields are extremely small, but it should be pointed out that the processing of the crude oil could be revised by operating primarily for gaseous products so that yields of more than 5 per cent of propylene (rather than 0.4 per cent) could be obtained from crude oil if the yields of all other products were sacrificed.

Compressed Methane Fuel

We have a large flow of gas showing only methane 95.6 per cent, carbon dioxide 1.7 per cent, oxygen 0.2 per cent, and nitrogen by difference 2.5 per cent. Are you familiar with any process by which a so-called knockless aviation fuel has been developed from this gas?—C. W.

The octane numbers of the simple normal paraffin hydrocarbons increases rapidly as the number of carbon atoms is decreased, as follows:

	Atoms	Oct. No.
n-Octane	8	—28
n-Heptane	7	0
n-Hexane	6	59
n-Pentane	5	64
n-Butane	4	91
Propane	3	100+

It would thus appear that ethane and methane would have even higher octane numbers, and since detonation is said to be almost impossible with fuels having an octane number of 120 (obtained by blending), it is possible that methane or ethane without further treatment would be super fuels. Similarly, natural gas of the common analysis should be a super fuel.

The Germans and Italians have for some time (Egloff and Van Arsdell, Substitute Fuels as a War Economy, Chemical & Engineering News, 20, 649, May 25, 1942) been using compressed methane gas as a fuel for motor vehicles. This is done primarily because this is about the only high-heating-value gas that is available to them, methane being an abundant byproduct of several other chemical processes practiced in these countries. The gas is handled at the extremely high pressures of 1,000-1,500 lb. per sq. in., because such pressures are necessary in order to keep the size of the container to a reasonable dimension. In this respect, ethane would be more satisfactory and propane and butane would be even better because they can be liquefied at reasonable pressures. Thus, the pounds and heating value of these and other common fuels contained in a 10-gal. tank would be somewhat as follows:

Material—	Pressure, gage	Pounds (approx.)	B.t.u. (approx.)	Oct. No.
Methane	1,500	6.1	146,000	high
Ethane	900	17.1	400,000	high
Propane	200	39.2	850,000	100 +
i-Butane	70	44.5	947,000	99
Butane	60	46.0	981,000	91
Aviation gaso.	10	60.0	1,220,000	100
Diesel fuel	1	70.0	1,370,000	(*)

*Purposely very low.

Inasmuch as methane is an extremely unreactive hydrocarbon from a chemical standpoint, it is highly doubtful if any processes have been developed whereby it can be converted into a regular liquid-type aviation fuel.

Definition of Codimer, Dimer, Polymer, Etc.

Will you please give definitions for the term dimer and codimer?—G. P. H.

Many organic chemicals and notably the olefin (or unsaturated) hydrocarbons are so reactive that molecules of the material can easily be made to combine with other molecules of the same material or similar materials. Thus if two molecules combine together to form a larger one, the product is called a *dimer*—

2 Ethylene —→ Butylene (butene)

If three molecules combine together to form a single new molecule, the product is called a *trimer* (3 ethylene mols go to hexene or hexylene), and if a large number of molecules combine together the product is a *polymer*.

The prefix "co" as *codimer* (also called *hydrocodimer*) is the same as a dimer except that two different molecules combine—

Ethylene + Propene —→ Pentene

If three or more molecules of two or more kinds should combine together, the naming of the product would be extremely complicated and hence it would probably be best to refer to them simply as mixed polymers.

Refinery IDEAS

. . . that save $ $ $

Pump-House Design Incorporates Some Unusual Features

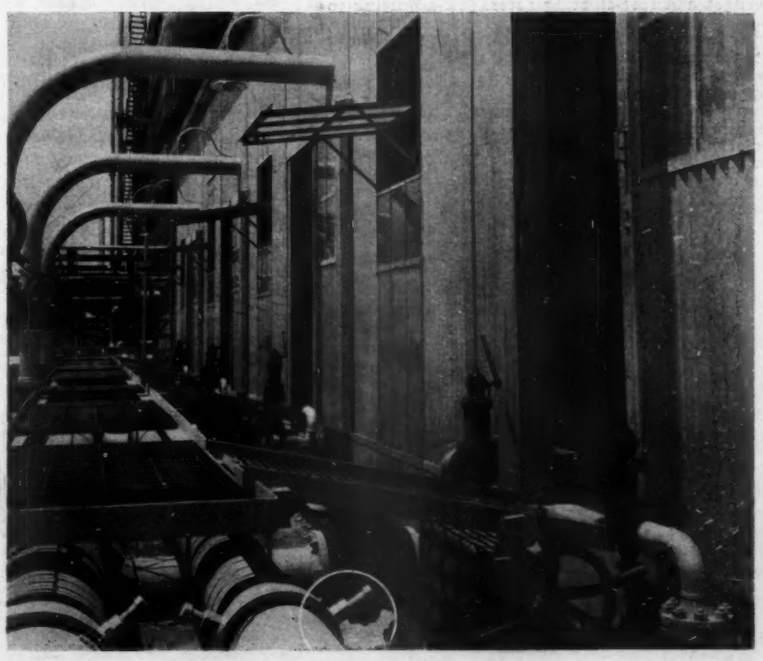
A typical well-designed pump house is shown. Several sound but unusual practices are revealed. One is the use of a short angle iron to support and tie together the overhead lines. The vertical support is a 1-in. angle iron, the upper end of which is welded to the roof supports and the lower end is welded to a short, horizontal angle-iron support to form an inverted T. The one flat side of the horizontal member supplies adequate bearing surface for the pipes while the other side furnishes strength. The U-bolts around the pipes hold the pipes to the angle-iron supports and keep the pipes from shifting or vibrating excessively. Another feature of this pump house is the use of grating in the floor to cover pipes and through which service lines are passed. This treatment makes the connections more accessible.

Hose Wound on Short Section of Large Pipe

With rubber hose being recognized as an item to be especially well cared for, one refinery has installed simple supports for its scattered plant hoses. An installation of one of these supports is shown here. The small pipe or stand supports the drum over which the hose is wound and extends above the level of the top of the drum to serve as a stop for the drum. The two metal lugs welded to the periphery of the open drum on the front serve as the stops on the opposite side. The drum itself is a short section of large pipe and of course is cut from scrap material.

Sliding Doors Save Space and Promote Safety

Several valuable suggestions are offered in this picture. The sliding door saves space and promotes safety. It enables the location of the two valves relatively close to the doorway. Another suggestion offered is the use of angle iron to make the frame for the walkway. This provides strength, fire protection and allows sections of grating to be used instead of requiring a continuous strip of material. It thereby facilitates the quick removal of any sections for the repair of pipes located below the grating. Still another feature of this installation is the use of adjustable setscrews, each one of which passes through a stationary and a movable nut and impinge against a plate which, in turn, fits against the side of the high-pressure pipe. The heavy ring of steel which supports the screws and nuts is securely bolted into a concrete base.



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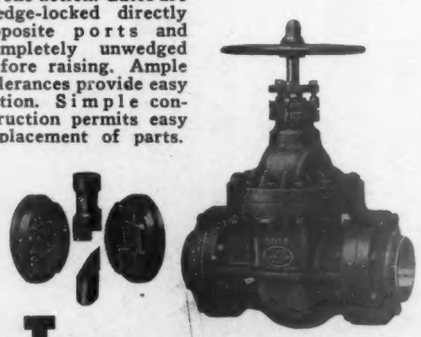

LUDLOW VALVES

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The Halogenation of Aliphatic Hydrocarbons

(Continued from Page 40)

ficiently low to avoid reversibility of equilibrium. It was believed that propene and hydrogen chloride did not react in the gaseous phase at relatively high temperatures,[88] but with increased pressure the reaction took place. The reaction rate increased with temperature as long as the density decrease was not relatively greater than the temperature increase.[89] Likewise, the rate of the liquid reaction increases with temperature until the density begins to decrease rapidly. These results have been interpreted as showing that the "structure" common to the liquid state favors high reaction rates. Kistiakowsky and Stauffer found no reaction in the gaseous phase between ethene, 2-pentene, or 2-methylpropene and hydrogen chloride.[90] Reaction, however, takes place in the liquid phase and probably occurs by a chain mechanism. The product of 2-methylpropene was tert-butyl-chloride, while isomerization to isobutyl chloride at elevated temperatures was slight. Hydrogen chloride addition to the three butenes differs enough that it may be used as a separation procedure.[91] Both 1-butene and 2-butene form secondary chlorides and byproducts at —78.5° while 2-methylpropene readily forms tert-butylchloride and no byproducts. 3-Methyl-1-butene presents a peculiar case. From pure, dry reactants in the absence of light at room temperature, an excellent yield of chlorides consisting of equimolecular quantities of secondary chloride and tertiary chloride was obtained.[92] The formation of the tertiary product was attributed to a rearrangement of an intermediate:

$$(CH_3)_2CHCH{=}CH_2 \xrightarrow{H^+} (CH_3)_2\overset{+}{C}HCH_2CH_3 \xrightarrow{Cl^-} (CH_3)_2CHCHClCH_3$$

$$+ \downarrow$$

H: rearranges

$$\downarrow \qquad\qquad Cl^-$$

$$(CH_3)_2CCH_2CH_3 \rightarrow (CH_3)_2(C_2H_5)CCl$$

Addition of dry gaseous hydrogen chloride to 3-hexane did not take place from —20° to room temperature, while with an aqueous reagent at room temperature, a yield of approximately 45 per cent 3-chlorohexane was found.[19] Tuot[93] obtained no addition reactions of hydrogen chloride with hydrocarbons of 8 to 11 carbon atoms at 20°.

Addition of hydrogen bromide compares with that of hydrogen chloride. Propene at 0° and —78.5° added an appreciable quantity of dry hydrogen bromide.[91] Ingold and Ramsden found reaction with 1-pentene at 18° ± 2° in the absence of light.[94] With dry hydrogen bromide 3-methyl-1-butene exhibits similar behavior to that observed with hydrogen chloride. The bromide yield, however, contains the tertiary isomer in greater proportion than the secondary isomer.[95]

Since compounds with equally hydrogenated unsaturated carbon atoms cannot be classified under Markownikoff's rule, Wagner and Saytzeff studied the reaction of hydrogen iodide and 2-pentene and reported the preferential formation of 2-iodopentane. Lucas and coworkers, however, found a predominance of 3-bromopentane in the products of 2-pentene and hydrogen bromide.[96] Lauer and Stodola obtained almost equimolecular amounts of 2- and 3-bromopentane.[97] Similar results were reported by Kharasch and coworkers for both hydrogen bromide and chloride reactions in a variety of solvents.[98]

3-Hexene[19] in carbon tetrachloride adds dry hydrogen bromide at 20°. The alkenes of 8 to 11 carbon atoms give the corresponding monobromides at 0° while the corresponding chlorides and iodides are not formed under similar conditions.[93]

The more reactive hydrogen iodide forms addition compounds with alkenes but the reversibility of the reaction limits success in obtaining good yields. Ethyl iodide is not very stable and its decomposition is catalyzed by iodine.[99] Hydrogen iodide[94] adds to propene and 1-pentene in the absense of light at 18° ± 2°. Propene formed about 22 per cent primary product, 1-iodopropane. With the higher alkenes Tuot obtained polyiodides instead of monoiodides due to hydrogen iodide dissociating more rapidly than it "fixes" to the hydrocarbon.[93]

The character of the solvent influences the reaction rate. Comparative results of several solvents in the addition of hydrogen bromide and chloride to 3-hexene show that the rate of reaction decreases with the increasing tendency of the hydrogen halide to coordinate with an electron-donor atom from the solvent.[100] Solvents such as ether and nitrobenzene containing electron-donor atoms, oxygen and nitrogen, inhibit the reaction while solvents such as xylene and heptane do not. These results do not show a good correlation between dielectric constants and reaction rates. In the addition of hydrogen bromide to propene, polar solvents such as water, alcohol, and acetic acid did not promote the reaction, while some organic compounds such as hexane, cyclohexane, benzene, and organic bromides actually catalyzed the reaction.[101] The reaction with butene, however, was not inhibited by acetic acid.

Orientation is influenced by the solvent. In experiments with propene and 1-pentene adding hydrogen bromide or iodide, primary halides were favored by solvents in order of the relative values of internal pressure of the solvents.[94] The order of positive effect is propane > nitrobenzene > acetic acid > water. This order of effect is not in agreement with the order of their dielectric constants or the order of their respective electronegativities. Orientation of hydrohalides in the addition reactions of 3-methyl-1-butene is influenced by the solvent. In aqueous hydrogen bromide, a smaller proportion of rearrangement product, tert-pentyl bromide, formed than in reaction with dry hydrogen bromide.[95] In ether solution, over 50 per cent of primary product was obtained, while in water or without solvent, only tertiary and secondary bromides resulted. Considerable primary product formed in acetic acid solution, but the proportion of primary decreased greatly in dichloroacetic acid and a predominance of the rearrangement compound, tert-pentyl bromide, appeared. In trichloroacetic acid solution addition became normal; this is, only tertiary and secondary isomers were found. The presence of this strong acid increased the proportion of tertiary compounds over that found in reaction without solvent.

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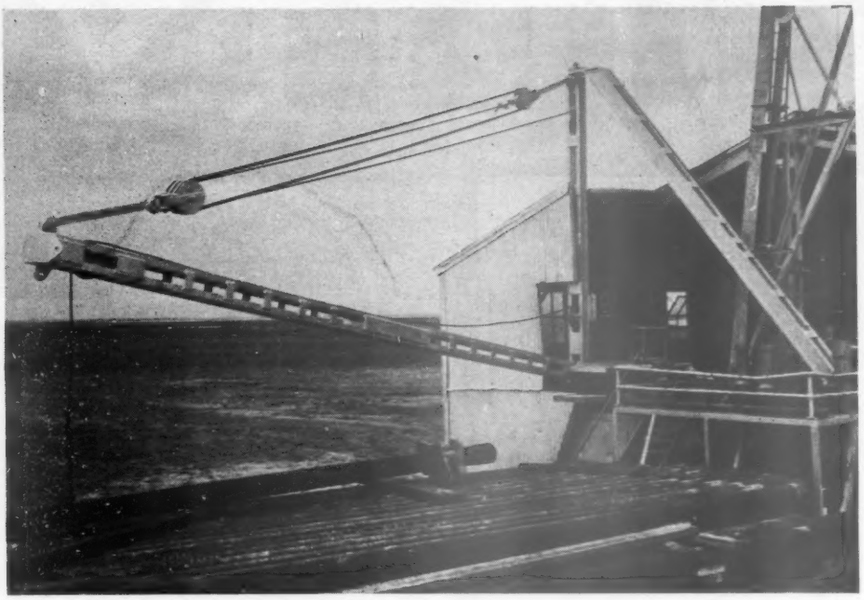
Operating Ideas

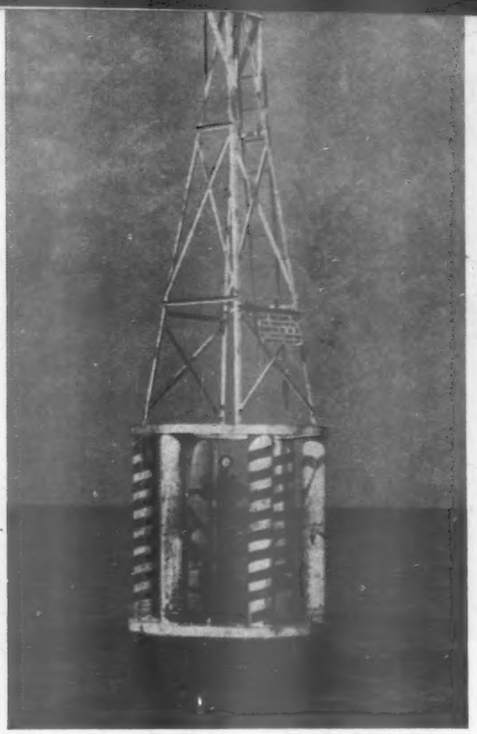


Cranes for Loading and Unloading Pipe

Drilling barges on the Gulf Coast are equipped with permanently installed cranes for loading or unloading pipe or other equipment from service barges. In some instances they may be operated by hand winches although frequently they are operated by engine-driven winches.

Protecting Storage Battery From Theft

Most internal-combustion engines used to pump oil wells are left unguarded much of the time; the pulling units likewise are often left at the well site over night when for some reason they have not completed the job. Many of these engines are cranked with a starter operated by the ordinary storage battery. To prevent theft of these batteries, one company has devised a special case for all pumping and pulling units. This is a steel box with a steel lid and a heavy steel strap on each side which projects about 1½ in. above the lid. Holes drilled through these straps allow a ¾-in. bolt with a drilled hole in one end to be placed where it will prevent removal of the lid. The bolt is locked in place with a heavy padlock which is placed through the drilled hole.



Protecting Christmas Trees On Water Location

Christmas trees of wells completed in exposed water locations on the Gulf Coast must be protected with heavy guards to prevent possible damage during storms, or by other blows. In the guard shown paint stripes on three legs on opposite sides make the guard more visible to boat operators. The "gin pole" structure on top the guard is for running bottom-hole pressure bombs, paraffin scrapers, or other tools.

Automatic Stroke Counters On Drilling Barge

Mud pumps on Gulf Coast drilling barges are located on the barge deck immediately below the engine floor, which is elevated on a superstructure. Most pumps are equipped with automatic stroke counters and operating indicators, which are installed with a chain-driven control to the pump below, on the engine floor where they can be seen without going below.

Refiners Learn What Factors Affect Diesel-Fuel Performance

REFINERS have consistently contributed directly to the program of making better gasolines for the 28,000,000 motor cars on the road. They have produced good diesel fuels and have improved them as new developments in engine design took place but there has not been the general and intense interest shown in developing these fuels that has characterized the change in gasoline. The answer, of course, lies in the smaller quantity of diesel oils consumed.

But in the past 2 years, more and more emphasis has been placed in certain quarters upon the change in diesel use on the roads and the need for improved fuels to meet the new demand. No one can pass along the roads through the western states without noticing the extended use of diesel-drawn trucks and especially the projecting diesel exhaust pipe that blows alternately, black smoke, a blue haze, or a grey cloud. Other than this unusual-appearing exhaust and the smoke emitted from the pipe extending into the air over the cab roof, the average motorist sees nothing unusual.

In the city, however, where there might be a congestion of diesel-driven trucks or buses, the first notice of something unusual in the traffic is the detection of a strange odor. This is ordinarily the result of a trace of diesel-exhaust vapors containing an aldehyde which is one of the decomposition and oxygenated products of combustion emmitted from the diesel engine. The quantity of this material formed will vary greatly under the changing conditions of engine operation.

Survey Fleet Operations

This problem and others connected with diesel-engine operation were reported by R. S. Wetmiller, of Texas Co., and Lt. L. E. Endsley, Jr., of the U. S. Army Engineers, before the latest meeting of the Society of Automotive Engineers. The following paragraphs present in part their observations:

Preliminary work consisted of a critical survey of several fleet operations. The results confirmed reports that the most objectionable smoking occurred during idling, acceleration after idling, and occasionally deceleration with the clutch engaged. Smoke and odor occurring during the latter condition are due to governor maladjustment which permits fuel injection with the engine acting as a brake.

The engines were maintained in first-class mechanical condition during the entire project, particularly with respect to injector repair. All tests were conducted with a jacket temperature of 170° F. and crankcase-oil temperature of 180°-200° F.

Thirteen commercial-type fuels were used in the initial examination to trace the course of exhaust smoke and odor formation. It was observed that as engine output (fuel rate) is decreased from high-load conditions, a point is reached where there is a sudden increase in exhaust smoke. Further decrease in fuel rate results in increased smoke until a maximum is reached after which smoke decreases when combustion ceases. Examination of fuel sprays in bench tests disclosed that as injection rate is decreased the spray form deteriorates until at very low rates only dribbling is experienced.

It was further observed that smoke occurring at fuel rates above that for minimum smoke was predominantly of the black type resulting from unburned carbon particles in the exhaust gas as evidenced by soot collected on cotton-cloth exhaust targets. Below this value, smoke was predominantly of the white type resulting from vaporized unburned fuel; exhaust targets obtained in this region consistently showed fuel droplets and freedom from soot. It was further noted that in all cases where white smoke was obtained liquid fuel was found present in the exhaust system.

Both the fuel rate for sudden increase in smoke and the fuel rate for maximum smoke depend upon cetane number. Maximum smoke occurs at a fuel rate approximating that for complete misfiring as evidenced by the motoring horsepower being equal to the friction horsepower. The magnitude of maximum smoke is apparently related to volatility for fuels of 38 to 57 cetane.

It appears that an increase in cetane number will produce a decided decrease in exhaust smoke by virtue of its ability to support combustion under adverse conditions of low output. However, if a fuel is subjected to conditions such that complete combustion will not occur due to its low-cetane number an increase in volatility will decrease exhaust smoke through reducing the quantity of liquid fuel in the exhaust system.

It was found that the pungent order of diesel-exhaust gas is related to its aldehyde content in terms of formaldehyde. As engine output is decreased from high-load condition a point is reached where there is a substantial increase in exhaust odor. Further decrease in fuel rate results in increased odor until a maximum is reached at the lean limit of combustion.

Special fuels used to determine the influence of individual fuel properties on engine performance were made to be as identical as possible in all but one of the following variables which covered a much wider range than most commercial products: fuel type, cetane number and volatility. These were prepared by cutting the following stocks and blending with paraffin base (PB) gas oil in all cases in order to obtain the desired spread in cetane number:

1. Naphthene base (AB) gas oil.
2. Light cycle (LC) gas oil.
3. Heavy alkylate (HA).

In the lower cetane range this procedure furnished fuels representing predominantly naphthenic, unsaturated cyclic, and isoparaffinic stocks, respectively. In the higher cetane region all blends were predominantly normal paraffins because of the large amount of PB blending stock required in these cases.

Testing Schedule

These fuels were subjected to the following testing schedule:

1. During 18 minutes idling at 350 r.p.m., economy and exhaust smoke and odor were determined.

2. Immediately following this idling period maximum smoke was observed during full-load operation from idling to 1,400 r.p.m.

3. Economy, power, and exhaust smoke were determined when equilibrium had been reached at 1,400 r.p.m. full load.

During the course of the work on Engine A, the question frequently arose as to the effect of fuel properties on engines embodying different design features. In order to check this point, a limited investigation was carried out. With few exceptions, results obtained are in qualitative agreement.

In conclusion it appears that fuels may be chosen to give desired results along any selected lines of engine performance but it is not possible to obtain all desirable results with a single fuel, at least not without recourse to additives. For example, an increase in cetane number will reduce exhaust odor. However, an increase in either of these fuel properties is accompanied by decreased power and economy. The only present solution appears to be fuel selection on the basis of a compromise amongst the various factors involved. Proper interpretation of the engine performance characteristics most desired and consideration to the type and mechanical condition of the engine used should result in selection of fuels for utmost satisfaction. No doubt future engine design will obviate the necessity for tailor-made fuels and precise maintenance practices.

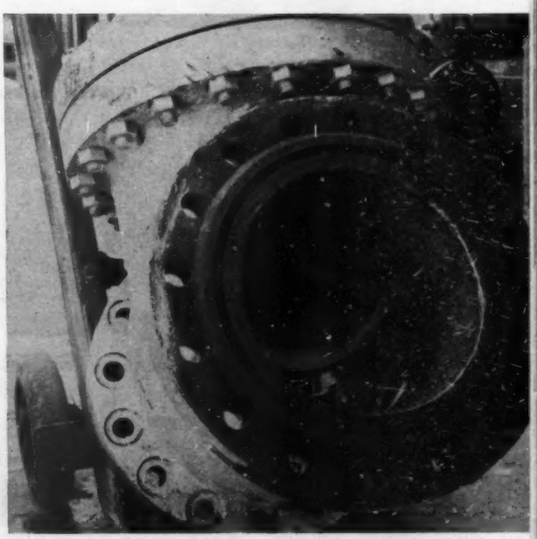
●

Large Valve Wash-Welded To Preserve Body

REFINERY valves usually undergo repairs for corrosion at the seat or other fittings. Then, after the body of the valve becomes relatively thin, the valve is discarded. In the case of large valves and under present conditions, when replacements are more difficult to secure, one plant is making a practice of wash-welding the interior of the body of every large valve that shows excessive corrosion. In the picture is shown a typical job.

The lines of the weld metal plainly indicate the procedure followed by the welder in applying the thin wash of noncorrosive metal. This method, used for protecting the interior surface, is preferred to relining the body with plate or strips of metal. By use of this method a perfect bond is secured between the valve body and the protective film and with reasonable care, an expert welder can produce a reasonably smooth surface.

The choice of the weld metal depends upon the type of oil or vapor to be handled, but there are sufficient kinds of welding rods available to permit the solution of any normal refinery-valve corrosion problem by this means. By giving the valve this protective film the life of the valve can be made almost indefinite, assuming the replacement of trimmings is possible as the need arises.



War Gives Impetus to Accident-Prevention Work

By J. B. HARRIS
Safety Director, Arkansas Natural Gas Corp.,
Shreveport, La.

CONSERVATION, no new term to the oil and gas industry, has taken on a new meaning in these hectic days of war. Heretofore, the term conservation has been applied chiefly to the reserves of a company, but now the meaning has been extended to include conservation of manpower, the greatest asset of a petroleum company.

Figures released by the American Petroleum Institute and the National Safety Council indicate that the petroleum industry, long a leader in accident-prevention work, has reduced accidental injuries among its employes to an amazing degree. Faced with mounting insurance rates, years ago the oil and gas industry launched a safety campaign that has resulted in saving thousands of lives, millions of hours of pain and suffering, and thousands of dollars in expense to the employing companies.

In addition to the above benefits, considerable good will among the employes has been gained, for this interest in the welfare of the field men has resulted in considerable satisfaction on their part. Thus this two-fold benefit has convinced all oil and gas companies that safety must and will be a permanent part of all operations.

Far-seeing executives, however, are not content to rest on these well-earned laurels but are projecting campaigns for future extensions of this program. They argue that such benefits can be multiplied by increasing accident-prevention activity within their companies. For example, the vice president of one company recently reported that in 1923 his company spent 10 cents for each $100 of pay roll in safety work. At that time, accidents cost the company $3.51 per $100 of pay roll. Last year the corresponding figures were 88 cents for safety work and only $1.03 in accident costs. This company, although spending nine times as much for accident prevention, made an over-all saving of $1.70 per $100 of pay roll, or approximately 50 per cent.

Operating Costs Rising

The fact that operating costs are rising needs no enlarging in this article. Such factors as higher taxes, additional investments in plant, deeper sands and changed spacing patterns will increase the per-barrel cost of oil so that the earnings on investment will tend to decrease more and more on a per-unit basis. It will be necessary, therefore, to give especial attention to conservation of manpower as well as conservation of oil and gas reserves. Industry has learned that it is a very expensive process to train a skilled worker. On the average the oil companies have an investment of $14,000 in each man on their pay roll. Steps to protect this investment are not only prudent but necessary.

These added costs can be partially offset by increased accident-prevention activity on the part of the industry. The idea is now commonly accepted that safe operation is efficient operation and prevention of accidental injuries can be largely controlled by the foremen. Accidents can be partially eliminated by furnishing employes adequate safety equipment and proper working tools. However, accidents are chiefly prevented by creating a state of mind in each employe—namely: a desire to work safely.

The savings cited above have been duplicated, even exceeded by many other companies. It is well to keep in mind, however, that the savings shown are only the "direct" or known savings that can be reflected in the records of the company. The "indirect" or unknown savings usually amount to four times this amount and, although intangible, are, nevertheless, just as possible to realize. Indirect savings are made by elimination of such factors as the following: Lost time of employes other than the injured worker, breakage of equipment, spoilage of material, time lost by foremen and superintendents investigating the accident, and others. All of these savings are realized by administering an aggressive, well-planned accident-prevention campaign and result in increased per-unit operating profit.

The current war has given safety work an added impetus. Everywhere there is an alarming shortage of manpower, especially skilled man-

Shell Oil Co., East Cromwell, Okla.

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Wherever exhaust noise cannot be tolerated—in oil fields and refineries all over the country—you'll find Burgess Exhaust Snubbers providing quiet exhausts on all types of engines. The new Shell Oil Company plant at East Cromwell, Oklahoma, is another plant where Snubber-equipped exhausts won't cause exhaust noise nuisance.

Because they operate on the patented Burgess snubbing principle, Burgess Snubbers effectively prevent—not muffle—exhaust noise before it can occur. Burgess Battery Company, Acoustic Division, 2823-J W. Roscoe Street, Chicago, Illinois.

Originators of Patented Snubbing Principle for Quieting Diesel Exhausts.

PUMPING STATION

RECYCLING PLANT

BURGESS DIESEL EXHAUST SNUBBERS

power. Employers, therefore, feel it vitally important to practice every means possible to prevent accidents from robbing the company of the services of the men on the job. Supervisors and foremen are being charged with the responsibility of insuring the safety of each job that their men must perform. Thus, the oil industry is doing its part in helping produce an uninterrupted flow of defense goods to defeat the Axis.

There are other aspects of a safety program that are now being studied by executives. More and more company officials are being convinced that these new trends should be incorporated into their own planning since such expansion will accrue even greater benefits to the employer and employe than those cited earlier in this article.

The first of these is the "near accident." It is now an accepted fact that an accident is merely a culmination of a series of unsafe acts, or a combination of a series of unsafe acts and unsafe conditions. It is equally as well known that on an average an accident almost happens 150 times before it actually does occur. Proper accident prevention is, as its name implies, prevention rather than cure. Therefore it is important that more and more attention be paid to these near accidents with the idea of preventing a real accident, with its resultant disabling injury.

The second of these new trends is prevention of "off-the-job accidents." Company executives are equally as well sold on the fact that the employer pays for an accidental injury whether it occurs on or off the job. The off-the-job accident does not compel the employer to pay compensation and medical benefits, but since these usually amount to about 25 per cent of the total cost of an accidental injury, there are other costs equally if not more important.

When an employe is disabled off the job, the employer is forced to compel the other employes to double up, or hire another man to replace the disabled one. This results in lowered efficiency and increased production costs. There is often additional expense incurred when the disabled man returns to work. Usually he is still weak and unable to perform his full duties; in this case he is generally paid his full salary although the company is not receiving full benefit from his labor.

Sickness and ill health, too, are taking their toll of employes and adding to the operating expense of the plant or district in which they are employed. For instance, the common cold takes the average employe away from work a few days each winter and lowers his efficiency on many other days. Influenza and pneumonia often resulting from colds increase the seriousness of the problem. Many companies have reduced the absenteeism from this cause by issuing oral cold vaccine to all employes.

It is the opinion of the medical profession that these millions of man-hours lost to industry through sickness and disease could be saved by an organized and systematic approach to the health problem. True, there would be considerable cost involved, but just as the safety campaign mentioned earlier, this added expense would in the end result in net savings.

The problem, or the approach to the problem, is slightly different from that of prevention of accidental injuries on the job. There the employer can enforce rigid rules if necessary to compel the employe to follow safe methods of working. Off-the-job accidents and illness, involving the employe's own time, must be approached in a different manner, one that will not smack of paternalism.

This matter can largely be handled by precept and example plus a sound advertising and selling program on the part of the company executives. One cannot stress too emphatically the necessity of company executives, including all supervisors down to the foremen, being sold on the advantages to be gained by such an enlarged program. Use of company publications, statements by the chief executives, leaflets attached to pay checks, or included in pay envelopes will have a most helpful effect on the rank and file of employes. The employes must be sold on the idea that they will benefit personally from this added emphasis on prevention of home accidents and auto accidents plus the necessity of keeping in good physical condition. This is the only way that a response can be obtained.

It should be expected then to see increased safety and welfare activities throughout the industry. Not only will new means be found to prevent injuries on the job, but employes will be encouraged to keep safe and well while off the job. Preemployment examinations, now common throughout the industry, will be supplemented by annual follow-up examinations and employes will be encouraged, by use of hospitalization-insurance coverage and other means, to take corrective measures to insure their good health. Home and traffic accidents will be studied and measures for their prevention widely disseminated. The average petroleum worker is twice as apt to be injured away from work as on the job. The trend is to give this situation a "blitz" treatment and insure for the individual and his employer a safe and healthy condition so that both will profit.

Kerr-Lynn & Co. Rig No. 6, on location at their Trapp No. 1 well in Seminole County, Oklahoma. Two Le Roi RX1V engines powering the latest style Lee C. Moore jackknife cantilever mast. This rig drilled in wildcat territory to the first Wilcox sand, approximately 4280 feet, in 16 working days.
"...very economical in operation as well as efficient. Flexibility most desirable. Power well balanced
KERR-LYNN & CO.
...say Kerr-Lynn & Co., about their satisfactory results with

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Here is a company which started using Le Roi power on their drilling rigs in 1934. Since then, as they have replaced their rigs, all have become Le Roi-powered. Results such as these do not just happen. They come out of years of experience in oilfield service—expressed in Le Roi's advanced design, heavy-duty construction, precision manufacture, and special features which assure you of the same low-cost, long-life, trouble-free operation. You get flashing, flexible power and fuel economy, with Le Roi engines. Use them on your next rig. Write for bulletin DE-4 giving complete information on 4-, 6-, 8-, and 12-cylinder Le Roi Drilling Engines.

P-15

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Fuses vs. Thermal Circuit Breakers For Low-Voltage Motor Starters

By W. G. TAYLOR
Industrial Engineering Department, General Electric Co.

EVERY oil company has occasion to use fuses or circuit breakers for protection of low-voltage electric motors and control apparatus from the abnormally high currents which result from all kinds of accidental short circuits, including grounds and other faults. Fuses are the oldest form of such protection, and have been termed by some as old-fashioned, possibly because they must be replaced or refilled after being blown; in fact, they are not at all out-of-date. Circuit breakers are of more recent vintage and are reclosable without replacement.

As the most extensive use of these protective devices is on low-voltage circuits, and as the comparison which will be made here applies particularly to these devices as designed for such circuits, this discussion will be limited to equipment for voltages up to 600. Before proceeding with a comparison, however, it is necessary to distinguish between two fundamental designs of circuit breakers which are available, both of which are in use. These are usually called "thermal" breakers and "magnetic" breakers, referring to the type of overload trip for which each was first designed, but their inherent difference is more fundamental than a matter of the type of trip employed.

Thermal Breakers

The thermal breaker, which originated as a substitute for fuses in lighting distribution panel boards, was necessarily designed for low cost to be more nearly competitive with a fusible switch. This means that many of the better mechanical features, included in the higher-priced magnetic breaker to give fast, consistent operation, cannot be incorporated in the inexpensive thermal breaker, and that the latter in general has lower interrupting capacity. It was originally equipped with only a thermal device for tripping it on overloads, whence came its name. Its use in larger sizes was later extended to motor protection. Although, in some cases, an instantaneous magnetic trip has been added, this has been done without any fundamental change in mechanical or electrical design or in interrupting capacity, and so the breaker still remains the inexpensive type known as the thermal breaker.

Magnetic Breakers

The other type of circuit breaker, designated as "magnetic," is designed basically with a magnetic tripping device, and this is why it is so named. It is much more of a quality product than the thermal breaker, and its relative cost is therefore naturally higher. Being too expensive for individual lighting-circuit protection, it cannot compete with fuses for such service, and so is not built in very small sizes. This type of breaker antedates the thermal breaker by many years, and is well known by everyone. It is widely and properly used for protection of main, feeder, and branch circuits, and is built with relatively high interrupting capacity. It is sometimes equipped with both a thermal trip and a magnetic trip, but this does not involve any fundamental change in design. Because of its cost, it is seldom used for individual small-motor protection, and so it is not included in the comparison which will be made between fuses and thermal breakers.

Still another distinction will be drawn before proceeding with this comparison, and this is between nonrenewable and renewable low-voltage cartridge-type fuses. The renewable type of fuse will not be considered here, because it has less interrupting capacity and may be more erratic in its action. The greater interrupting capacity of the nonrenewable type is due to the arc-quenching action of the filler within the cartridge, and its greater reliability results from soldered instead of hand-tightened-screw contacts for the fuse links.

Only high-quality NEC fuses, consistent in their operating performance, are considered here, such as those rigidly clamped in vise-type terminals to make full contact under pressure, which provide insurance against blown-fuse trouble caused by overheating as a result of poor contact, and hold the fuses in place during heavy short-circuit currents.

Comparison of Fuses and Thermal Breakers

This comparison has reference primarily to fuses in air and thermal air-circuit breakers as used for motor starters to give the necessary short-circuit protection. They are employed extensively in combination motor starters in the production division of the oil industry (Fig. 1). Combination starters in explosionproof enclosures or immersed in oil, applied more generally in the refining division, involve different factors which will be mentioned later.

Power feeders and branch circuits belong in a different category; there the magnetic air circuit breakers find their logical applications, which are outside the scope of this discussion.

By the process of elimination, the comparison which follows has been narrowed to one between high-quality, nonrenewable, low-voltage, clamped-in, cartridge-type NEC fuses and thermal low-voltage air circuit breakers, for either of which there is a wide field of application in industrial service, especially as incorporated in combination motor starters available in standard designs up through 200 hp. in rating (Figs. 2 and 3).

1. The fuse is faster, that is, it will open the circuit with any short-circuit current, within its interrupting ability, in a shorter time than a thermal breaker with no instantaneous trips. When the latter are added, the breaker may operate as fast as, or faster than, a fuse on moderate overcurrents, but in this current range either a fuse or a breaker will be fast enough to give adequate protection. As the magnitude of the fault current increases, however, the speed of opening of the fuse increases in proportion to the square of the current and becomes faster than that of the breaker. The fuse will take a motor off the line before fault current has had time to build up to its maximum value, but the thermal breaker may not open up the line until after maximum current has been reached. The fuse, therefore, offers the better protection, as the equipment thus protected has much less chance of being damaged seriously by fault current.

2. The nonrenewable fuse has higher interrupting capacity and more current-limiting effect than the thermal breaker. Low-voltage systems supplied from transformers are likely to have

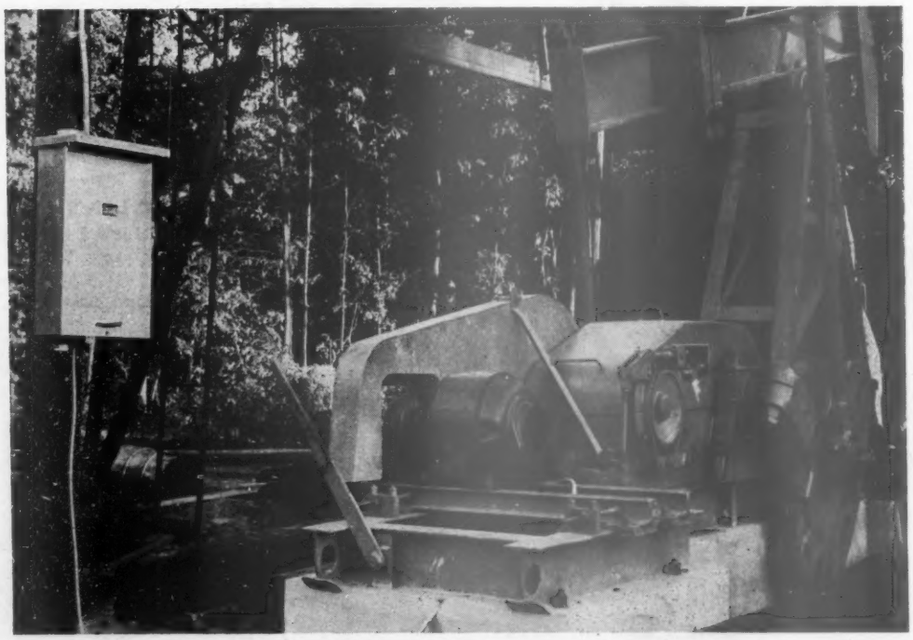

Fig. 1—Typical well-pumping unit installed in Illinois with the electric motor drive protected by fuses. Starting equipment in weatherproof cabinet on pole on left

OIL and GAS JOURNAL EDITION

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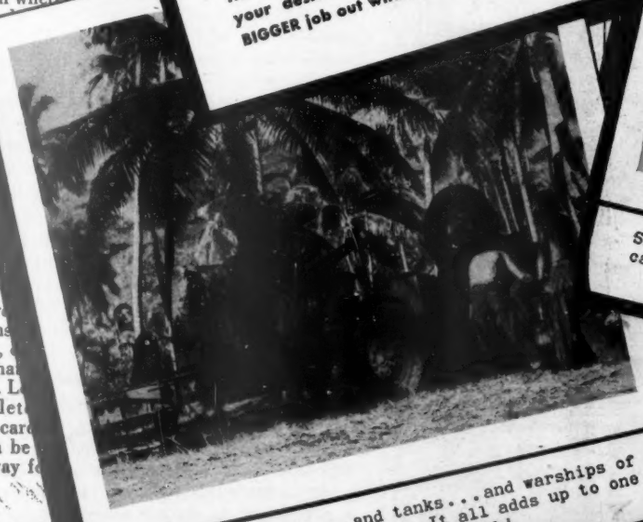
STEEL FOR DRUMS AND BARGES -- thousands of them to carry vital supplies, is another critical war need your steel sacrifices are making possible.



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*NOTE: The above are official U.S. Navy photos taken during the fortifying of a secret position in the South Seas. The name of this island cannot be revealed for obvious reasons . . . but operations here are typical of the **many** and varied requirements your steel conservation helps to meet.*

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…*putting rig where* …*working height can't be used to*

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And quick, *positive* lubrication is …se fitting *separate* …en grease …he fittings …e easy to anything! …ock is avail- …eave models …acity of 30, respectively …*ve!*).

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available* short-circuit currents at least from 10,000 to 20,000 amp., with a strong probability that they will be considerably over 30,000 amp. Cartridge-type fuses have been demonstrated by tests to be capable of opening short circuits on such systems successfully, this being due largely to fast action of the fuses and their current-limiting effect, both of which arrest the rapid rise of fault current. Thermal breakers, on the other hand, cannot be depended upon to open circuits with available short-circuit currents beyond their rated interrupting capacity, which is 5,000, 10,000 or 20,000 amp.

3. The nonrenewable fuse has no moving parts to wear or be adjusted; in fact, it is one of the most consistent and reliable short-circuit protective devices known. Its value is enhanced by the fact that modern fuses for motor-circuit protection have cadmium or silver-plated metal ferrules and fuse clips, so that there is little chance for corrosion which might produce local heating and result in premature blowing of a fuse. It is further enhanced by the use of vise-type terminals which insure good contact under pressure, resulting in less possibility of local heating.

When a fuse burns out it opens the circuit; in other words, it "fails safe." If its characteristics should change at all, it will blow at a lower rather than a higher current, and thus overprotect rather than underprotect the circuit.

4. The trip settings of thermal air circuit breakers are calibrated at the factory and not adjustable in the field. If a change is made in the field by changing the thermal elements of the tripping mechanism, there is then no certainty, except in a very few designs, that the calibration will be correct, as in most designs the thermal trip should be calibrated with and in the breaker to insure accuracy, and this is obviously a factory operation. On the other hand, if a change in the rating of a fuse is desired, this is done in all cases by inserting a fuse of different capacity, of course within the limitation of the capacity of the fuse support.

5. Replacement of a blown fuse does not necessarily or usually cause any costly production delay. Sometimes a short circuit of sufficient intensity to blow a fuse or open a breaker may require some work to be done on the starter, the motor, or the wiring, to eliminate the fault, and may make it advisable to check the condition of devices in the circuit and perhaps to dress some contacts. If this should be the case, it will usually take longer than the time required to obtain and insert new fuses.

6. Combination starters with fusible manual switches are consistently lower in price than similarly rated combinations using thermal breakers, and so the fused switch not only will give better protection but will do so at less cost to the purchaser.

It is not often that a device of lower cost will frequently do a better job, and this is therefore an example of interest to a wide circle of users of motors and control equipment. The circuit breaker has had considerable appeal to many because a motor circuit can be reestablished by closing the breaker, while blown fuses must be replaced. Some may have given little thought to the fact that power service cannot be restored successfully until the fault is removed, and sometimes not until devices in the circuit have been serviced—all of which take time. For these reasons a gain in time is not always assured with a breaker in a motor starter, except possibly when the starter is oil-immersed or in an explosion-proof enclosure, as will be discussed later.

Space limitations in the design of some types of low-voltage control assemblies make it advisable to use circuit breakers rather than fuses when the physical size of the fused switch is considerably larger than that of the corresponding breaker. Individual fusible combination motor starters, however, are available in all sizes up through 800-amp. fuse-clip capacity.

It should not be overlooked that a motor and its starter and the circuit between them, which are protected by fuses or a circuit breaker, are seldom subjected to conditions which produce short circuits. Such protective devices, therefore, are called upon to open the circuit only in comparatively rare cases, and the time lost in putting them back into service is not likely to amount to much over a long period of operation.

Low-voltage power feeder circuits, on the other hand, may encounter conditions of storm, lightning, falling objects, etc., to which most individual motor circuits may never be subjected, and so feeder circuit interruption is likely to be more frequent. Many of these troubles on a feeder circuit may be self-clearing, but nevertheless are likely to trip the feeder breaker. Because the shut down of a feeder usually involves an extensive load and may also mean loss of revenue to the power company, it is very important to get the feeder back on the line promptly. Circuit breakers often permit a quicker reestablishment of such service and therefore are recommended.

One point sometimes considered in favor of a circuit breaker for a motor circuit is that it will open simultaneously all three lines of the three-phase circuit, with no possibility therefore of the motor being left energized by a single phase after occurrence of a fault. On the other hand, this possibility on a fused circuit is remote. If the low-voltage system is ungrounded, a short circuit, or accidental grounds on two phases, will blow two of the three fuses. A single ground will have no effect on operation. On a system with grounded neutral, an accidental ground will blow one fuse, but the increased motor current on the resulting single-phase operation will actuate a properly adjusted overload trip on the motor starter, and thus take the motor off the line. It is unnecessary, therefore, to use a circuit breaker to insure such protection. A three-pole breaker would, however, provide greater safety to anyone so careless as to contact an interrupted circuit before opening the line disconnecting switch.

The lowly fuse evidently has a definite and well-established superiority in several respects in modern low-voltage practice. Time-honored though it may be, it is neither antiquated nor obsolete. Although in a large percentage of cases it affords the best protection for low-voltage motors and control equipment, it is recognized that considera-

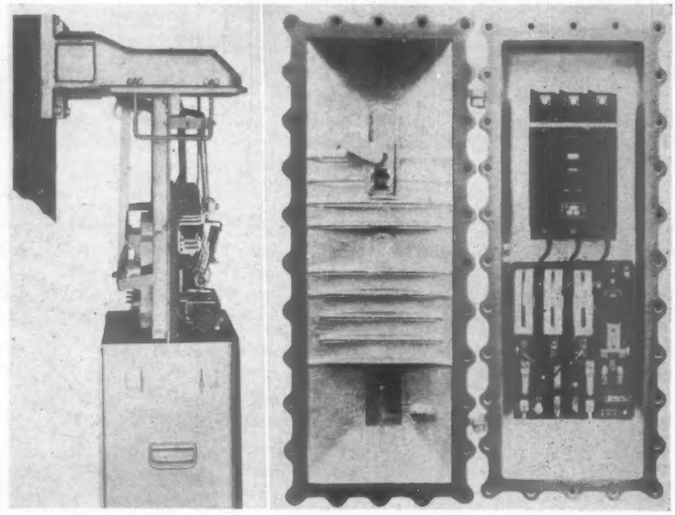
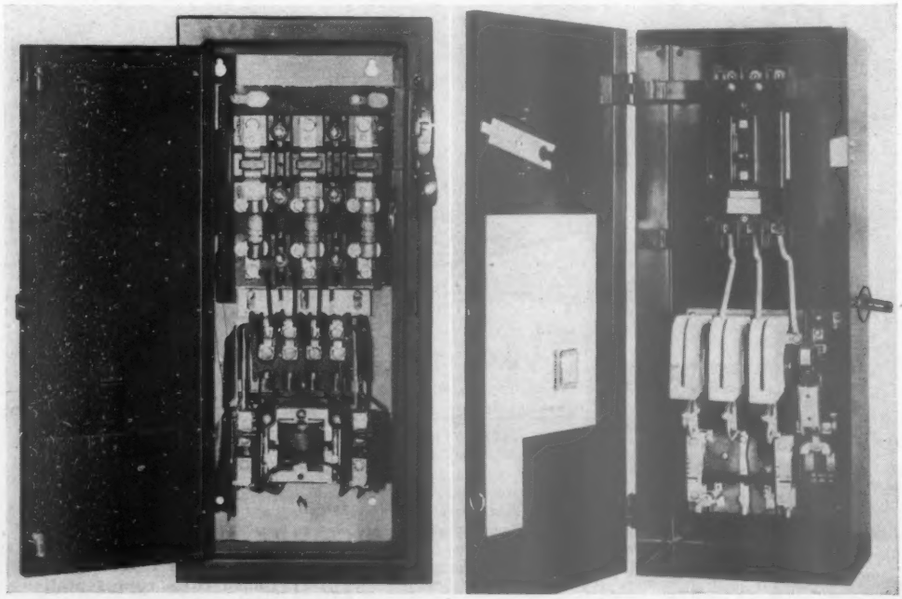


Fig. 2—(below, left) Combination low-voltage general-purpose motor starter with fusible disconnecting switch and vise-type fuse clips. Fig. 3 (below, right) Combination low-voltage motor starter with thermal breaker

Fig. 4—(right) Side view of an oil-immersed combination low-voltage motor starter, with oil tank lowered. The circuit breaker with instantaneous magnetic trip is on the back of the panel (at the left), and the starting switch is on the front. Fig. 5—(extreme right) Combination low-voltage motor starter with thermal breaker, enclosed for use in hazardous locations



*Available current is the maximum current which will flow in a circuit if the interrupting device under consideration is considered to have negligible impedance.

tion of many different factors which may be involved, such as oil immersion, special types of enclosures, available space for installation, ease of restoring service, complete circuit isolation, and frequency of fault occurrence, often leads to the selection of the circuit breaker as the most practical short-circuit protective device under such conditions.

The magnetic breaker, though useful chiefly for low-voltage feeder and branch circuits and somewhat slower in action than a fuse on high overcurrents, is recommended for motor short-circuit protection where its higher cost is not a disadvantage, as it is free from all other disadvantages of the thermal breaker in such service.

Oil Immersion

Neither a cartridge-type fuse element nor the bimetallic strip of a conventional thermal-trip device will retain its tripping characteristics when directly immersed in oil; and when cartridge-type fuses blow in oil they vaporize it and produce dangerously high pressures within the cartridge. The use of either for oil immersion is therefore impractical. Conventional fuses in air in a submerged compartment are effective if no oil leaks in, but the construction to be safe must give absolute assurance of prevention of leakage, which is difficult to obtain. However, oil-immersed circuit breakers are available in combination with magnetic motor-starting switches (Fig. 4). The best of these breakers have better construction for oil immersion and higher interrupting capacity than the conventional thermal breaker, and are equipped with instantaneous magnetic trips. Such breakers are, of course, more expensive. Combination starters which include these breakers also incorporate the highly successful oil-immersed induction-type temperature overload relays, which, however, act on the starting switch instead of the breaker and are provided for overload, not short-circuited protection.

Generally the use of an oil-immersed combination starter with a high-grade breaker instead of fuses is justified by the simplicity of closing the breaker by an external handle as compared with the time and inconvenience involved in dropping an oil tank to replace blown fuses.

Explosionproof Enclosures

Because of very high pressures which may develop from the blowing of a fuse in the presence of gas in an explosion-proof enclosure, conventional cartridge-type fuses are unsafe when so enclosed, and therefore not permissible except in very small sizes for control circuits. Even if this were not so, the inconvenience of replacing a fuse, because of the large number of bolts in the cover of the explosion-proof case, would make fuses undesirable. An air circuit breaker will not seriously increase the pressure when it interrupts fault current, and is therefore the best available means of obtaining short-circuit protection under these circumstances (Fig. 5). The type of breaker which may be used depends upon the quality acceptable and the interrupting capacity required.

Obviously, it requires careful consideration to determine when and where to choose fuses or circuit breakers for short-circuit protection on low-voltage motor circuits, and this discussion of facts concerning them should assist in the exercise of good judgment in making the choice.

●

Safety Tip

If the fire in any heater has gone out while the fuel is left on, close the valve and open the fire-box door. Then get away from the vessel for a few minutes and allow it to air out. Use a long pole to place lighted waste or other material in the fire box, being careful not to stand immediately in front of the fire-box door. After the means of ignition has been placed in the fire box, open the fuel valve, again being careful to not stand in front of the fire box.

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Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 34

AUGUST 27, 1942

EFFECT OF PRIMING ON DEGREE OF SUPERHEAT

OFTENTIMES in the operation of boilers, considerable moisture is carried over into the steam lines in the form of water droplets. This condition exists particularly under high rates of steam delivery from the boiler and when using feedwater containing impurities. Such a condition is undesirable in saturated steam boilers because of the possible damage to the steam utilizing equipment; engines, for example.

If in a particular case priming is caused by impurities in the feedwater, naturally, it may be eliminated by proper treatment to remove such impurities or by securing water that does not contain them. High concentration of certain salts in the feedwater may cause priming, and this may be overcome by frequent "blowing down" of the boiler. Where these salts exist in the water in such quantities that the amount of blowing down necessary to keep the salt concentration below the priming point results in excessive losses, a new source of water or the application of feedwater treatment is often the best remedy.

Improper design or too high a water level, either of which may result in inadequate area of water surface or insufficient height of steam outlet above the water surface, may cause priming.

Excessive overload of a boiler may cause water to be discharged with the steam, even though the water is sufficiently pure and the water level and boiler design is correct for normal operating conditions. In this case the violent ebullition of the water, along with the fact that the heat-transfer rate is insufficient to produce dry saturated steam, accounts for the priming effect.

The presence of liquid water in the steam entering a superheater may have two principal ill effects, namely:

(*a*) Fouling of superheater tubes by dirt and other impurities carried in the water.

(*b*) Addition to the heat transfer requirement of the superheater. This means that with moisture entering the superheater the temperature of superheat will be lowered considerably below that which could be maintained if the steam entering the superheater were dry.

The lowering of the superheated steam temperature is due to the fact that part of the heat supplied in the superheater is absorbed to complete the vaporization of the water. If the steam entering contains w lb. of moisture per pound of wet steam, the heat required for the vaporization of the water is $w \times h_{tg}$. In such a case the loss in superheat, in °F., would be

$$L_{sh} = \frac{w \times h_{tg}}{C_p} \qquad (1)$$

Where,

w = pound of moisture per pound of wet steam

h_{tg} = latent heat of vaporization of water at existing pressure, B.t.u. per lb.

C_p = specific heat of superheated steam, B.t.u. per lb. per °F.

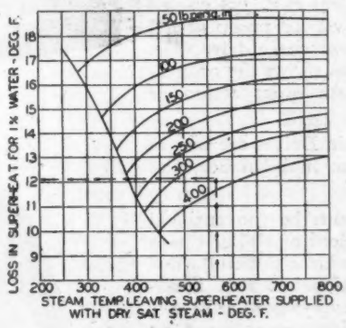

Fig. 1

The curves in Fig. 1 give the loss in superheat per each per cent of moisture in the saturated steam plotted against temperature of superheated steam when dry saturated steam is supplied to the superheater. By use of these curves along with values of temperature and pressure that would exist when a superheater is supplied with dry saturated steam, a value can be read directly, expressing the loss in superheat for each per cent of moisture (i.e., when $w = 0.01$). This loss obtained from the curves can then be multiplied by the actual per cent of moisture in the steam to obtain the total loss in superheat for the specific condition at hand.

Example.

Problem. — Steam leaving a superheater has a temperature of 565° F. at a pressure of 365 lb. per sq. in., abs., when the steam being supplied to the superheater is in a dry saturated condition.

Calculate the number of degrees that the temperature of the superheated steam would be reduced if the quality of the steam entering the superheater should suddenly change to 97 per cent.

Solution.

1. Using Equation 1 and steam tables:

$w = 1.00 - 0.97 = 0.03$ lb. of water per lb. of wet steam.

$h_{tg} = 790.6$ B.t.u. per lb. of steam. (The latent heat of vaporization at 365 lb. per sq. in., abs., taken from Table 2 of Installment 31.)

$C_p = 0.659$ (from Table 1, Installment 32).

So,

$$L_{sh} = \frac{0.03 \times 790.6}{0.659} = 36° \text{ F.}$$

Then, the temperature of the steam leaving the superheater would be lowered 36°, or to 529° F., because of the 3 per cent of moisture in the entering steam.

2. Using the curves of Fig. 1:

From the curves, the loss for 1 per cent moisture is found to be 12.1° F. (Follow arrows.) Then the loss for 3 per cent moisture is 3 × 12.1, or 36.3° F., which closely checks with the results obtained by the first method.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

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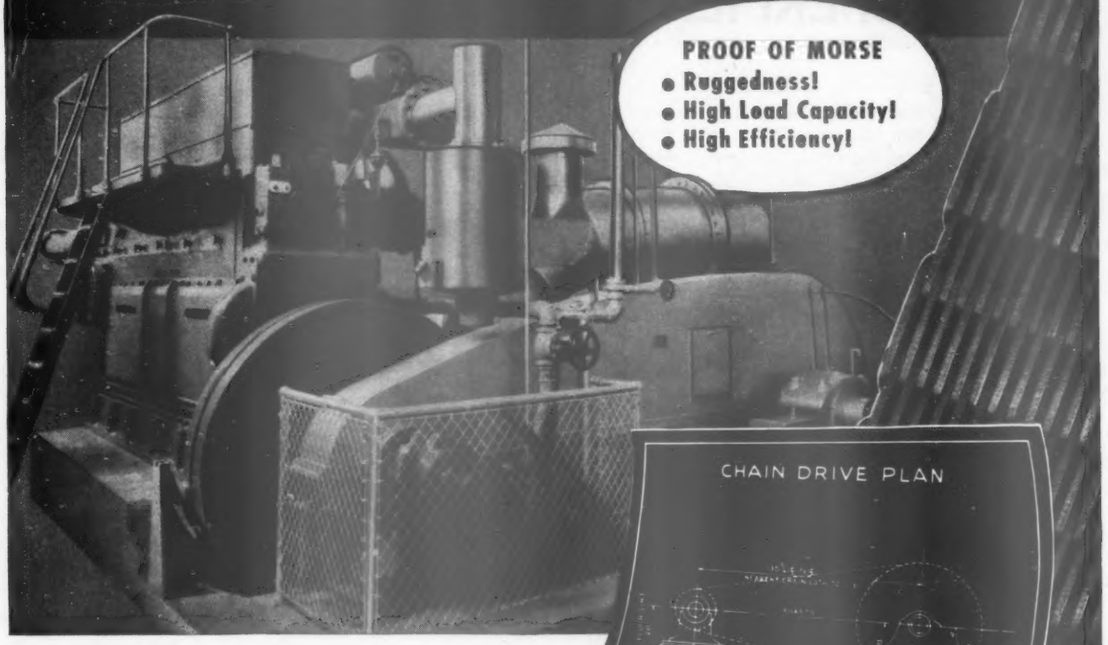

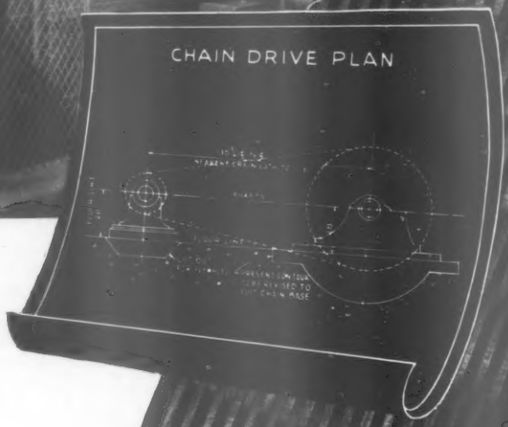

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Engineering Fundamentals

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL No. 35

AUGUST 27, 1942

CAPACITY OF STEAM BOILERS

THE term capacity as applied to steam boilers refers to boiler output and is expressed in terms of boiler horsepower. As defined in Installment 26, the term horsepower, in connection with most machinery, refers to the rate of doing work, and 1 hp. represents a work rate of 33,000 ft.-lb. per minute. The use of the boiler horsepower, however, as a measure of boiler capacity, does not have this meaning. Some operators are inclined to use boiler horsepower rating as a basis for comparing the power capacity of steam drilling rigs with the power capacity of drilling rigs having other types of prime movers. Even if boiler horsepower and horsepower in terms of work per unit of time were comparable it would be improper to compare drilling rigs on the basis mentioned; because most other prime movers for drilling service are rated near their maximum power output, while boilers are rated at less than one-third of the average capacity at which they are normally operated. In spite of its misleading nature, the term boiler horsepower has become so generally accepted that it would now be extremely difficult to abandon it entirely and substitute a more rational unit for measuring boiler capacity.

The standard boiler horsepower as now used in this country represents the hourly delivery of an amount of heat equal to that which would be required to evaporate 34.5 lb. of water from the liquid state at 212° F. to steam at 212° F. Since the latent heat of vaporization is 970.3 B.t.u. per lb. at 212° F., one boiler horsepower represents the transfer of heat by a boiler at the rate of 34.5 × 970.3, or 33,475 B.t.u. per hour. It is clear, then, that the term boiler horsepower is a measure of evaporation and not of power.

The horsepower rating placed upon boilers by manufacturers is arbitrarily based on the area of the heating surfaces. Such a rating has no direct connection with the boiler horsepower output as it was defined in the preceding paragraph. At present, manufacturers consider 10 sq. ft. of heating surface as being the equivalent of one boiler horsepower. This method of rating merely represents present-day opinion as to the amount of surface that under normal operating conditions should transfer 33,475 B.t.u. per hour.

The rating of a boiler based upon 1 boiler horsepower for each 10 sq. ft. of heating surface does not imply that the evaporation of 34.5 lb. of water from and at 212° F. with 10 sq. ft. of heating surface is the limit of the capacity of the modern boiler. Actually the amount of heat that can be absorbed in a boiler depends only upon the amount of fuel that can be burned in the firebox. Actually, it is possible for the rate of heat transfer, or actual boiler horsepower output, to be three or more times the value upon which boilers are rated. It should be clearly understood that a boiler is not necessarily in any state of strain when developing more than its rated capacity. On the other hand, as capacity increases, there will be, in general, a decrease in boiler efficiency. This makes it inadvisable to try to secure more than a certain maximum amount of steam output from a given boiler.

The condition of the feedwater is another factor that may limit the maximum capacity at which it is advisable to operate a boiler. This is true because an increase in capacity may cause an increase in the concentration of certain harmful ingredients in the feedwater, which may result in foaming, priming, and scale formation. Even if the feedwater is pure, the rapid rate of boiling accompanying higher rates of steam delivery may result in priming due to the violent agitation of the water surface.

The degree of overload that can advisably be placed upon a boiler, up to the point of maximum fuel consumption, then will depend upon: (1) The maximum reduction in boiler efficiency that can be tolerated, (2) purity of feedwater, and (3) evaporation rate at which priming becomes excessive for the particular boiler.

The maximum steam generating capacity that it is possible to obtain with an oil-field boiler depends as much upon draft as upon any other factor. Results of tests reported by Smith* show that a boiler will deliver from 150 per cent to 175 per cent of its rating with natural draft, using a stack comparable with the A.P.I. stack. Smith's test results show further that by sufficiently increasing the draft, the boiler can readily be made to deliver more than 300 per cent of its rated capacity.

*Smith, V. Weaver, "Modern Steam Drilling Equipment," Transactions of American Society of Mechanical Engineers, June 1936.

Example 1

Problem.—Four 125-hp. oil-field boilers at a certain rotary rig consume 1,350 bbl. of water per 24-hour day. The average temperature of the feedwater is 90° F. and wet saturated steam of 98 per cent quality is delivered by the boilers at 250 lb. per sq. in., abs.

Calculate.—(1) Average boiler horsepower output of the steam generating plant for the day.

2. Per cent overload of the boilers.

Solution.—(1) First calculate the average weight of water evaporated per hour, as follows:

$$w = \frac{1{,}350 \times 42 \times 8.34}{24} = 19{,}703 \text{ lb. per hr.}$$

Now, from the steam tables (Table 2, Installment 31) the heat of the liquid at 250 lb. per sq. in., abs., is 376.04 B.t.u. per lb. above 32° F.

And, from the temperature table of the steam tables, the heat of the feedwater at 90° F. is 58 B.t.u. per lb. above 32° F.

So, the heat of the liquid added by the boilers is (376.04 — 58), or 318.04 B.t.u. per lb.

From the pressure table of the steam tables, the latent heat of vaporization at 250 lb. per sq. in., abs., is 825.4 B.t.u. per lb.

Substituting in equation (1), Installment 30, the total heat added by the boilers to each pound of steam is:

$$h_t = 318.04 + 0.98 \times 825.4 = 1{,}126.93 \text{ B.t.u.}$$

Average boiler horsepower output of the boilers during the day of operation, then is:

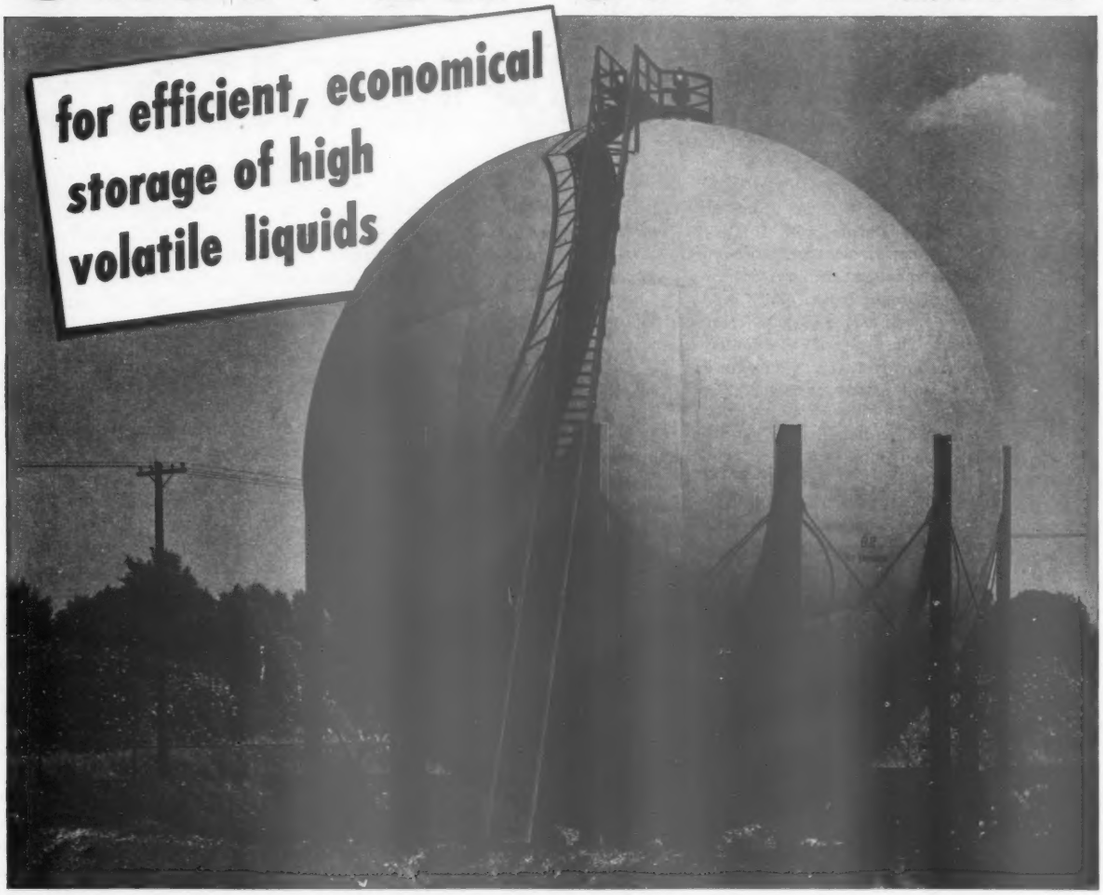
$$\text{Boiler hp.} = \frac{19{,}703 \times 1{,}126.93}{33{,}475} = 663.2$$

2. The total rating of the four boilers is 600 boiler horsepower. So the per cent overload would be:

$$\frac{600 - 663.2}{600} \times 100 = 10.5 \text{ per cent}$$

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

GRAVER SPHERES



In providing for the handling and storage of high volatile liquids, four important factors must be taken into consideration — deterioration, loss of volume, safety, and cost.

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A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

RIG OPERATION

AUGUST 27, 1942

MANY FACTORS AFFECT RIG COSTS

AVERAGE well costs have been reduced substantially within the last several years. Advancements in drilling and completion technique, improvements in equipment, adoption of more systematic practices, greater knowledge of general conditions, and other factors have combined to enable operators to increase their efficiency and otherwise effect major savings in development expense charges.

Means of cutting well costs have received increasing consideration. Development of deeper fields with their inherently greater operating costs, coupled with reduced current returns occasioned by proration and restricted daily production have made necessary enforcement of every economy possible. The fact that drilling and field development is being greatly curtailed is not diverting attention of operators from this consideration.

Drilling costs are closely associated with drilling time. Although there are other factors entering into it, generally speaking, the more hole that can be made within a given time the lower the well costs will be. A drilling rig pays dividends on the amount of hole that can be drilled with it, and so every unnecessary hour consumed in drilling a well means that more well cost. For this reason, one of the first considerations given by operators in reducing well costs is to provide facilities and adopt practices that will expedite the drilling of a well in the shortest time.

Greatest progress in reducing well time probably has been made on the Gulf Coast where, in the characteristic deep drilling of that district, savings in well time are particularly important. Reflecting this progress is the fact that routine 11,000-ft. and 12,000-ft. wells now are being drilled regularly in less than 30 days. It has been common in 7,000-ft. to 7,500-ft. fields for operators to follow schedules of 15 to 20 days for a well, with one rig making from a well and a half to two wells per month.

A major phase of well time is that involved in rig moves. By unitization of rigs, standardization of rig lay-out, and adoption of systematic procedure in tearing down and setting up important savings of time can be effected. Most benefits in this can be realized, however, in routine field development, with a succession of wells to be drilled where locations can be prepared and derricks erected in advance so that everything is in readiness for moving on the rig as soon as the preceding well is completed.

Every hour saved in moves is that much more time that can be utilized in making hole with the rig on the next well. One major company figures that the time of a rig in use or idle, is worth $15 per hour, so any savings in idle time can be translated readily into dollars and cents. This company has worked out a schedule of moving in which even one of its biggest and most complete rigs can be torn down, moved to new location, set up, and be drilling within less than 24 hours.

Contributing to this is the fact that the rigs of this company are highly unitized and sectionalized, and designed for quick dismantling and setting up. In the move, every unit is dismantled, loaded and moved in a set order, and then placed on the next location according to a uniform pattern. All piping and fittings also unitized and go into place on the next location with a minimum of fitting. In the schedule, dismantling of certain units usually begins before a well is finally completed, and setting up on the next location is under way while the preceding well is in process of completion.

Facilities include two derricks for each rig, and while one well is drilling the other derrick is set up on the next location. The provision of a good, all-weather road system in a field facilitates transportation of equipment, saving time and costs. Delays in moving are minimized by having adequate moving equipment on hand for each job.

In drilling, the elimination of as many round trips as possible is another major item of cost saving. Round trips not only entail actual cost in operation but involve time that otherwise can be utilized to better advantage in making hole. Round trips are minimized by selection of suitable bits for the type drilling and by observance of precautions in drilling to insure good hole. Naturally, a certain number of round trips are necessary. Time involved in round trips many times can be reduced by good crews and by effective utilization of hoisting equipment and adequate provision for racking of the pipe.

Modern drilling practices call for a minimum amount of coring, which results in saving of time and cost. Much coring has been replaced by electrical surveys, mud logging, and other such techniques. Simplified casing programs not only effect savings in pipe but also in time for running the pipe. Proper conditioning of mud generally is one of the most important factors in reducing well costs. Proper conditioning of mud not only expedites faster drilling but also insures maintenance of good hole and control of hazards that might cause costly trouble and delays. Expenditures for suitable mud materials generally are justified in the saving effected by elimination of hole trouble.

It is recognized, however, that it is not always the fastest drilling that results in the greatest saving of time. In all cases it is assumed that the greatest saving is with the most amount of hole that can be made consistent with safe, consistent drilling practice.

Representative of well time in modern field development on the Gulf Coast is the following tabulation based on the average of time of 10 random wells in a 7,100-ft. field:

Operation	Days
Rigging up	1.2
Tearing down	.7
Drilling	8.8
Repairs to rig	.6
Casing and cementing	4.6
Coring	.4
Fishing and sidetracking	.2
Slope tests	.4
Completing	1.0
Miscellaneous	7.0
Total	18.6
Footage per drilling day	818
Hours rotating	153
Footage per hour rotating	43.6
Total depth (feet)	7,039

Average well cost in the above field has been reduced to the following, based on average of 10 wells:

COST OF WELL

Labor	$4,605.83
Transportation	1,008.04
Casing and tubing	10,154.86
Misc. well equipment	1,115.18
Rig and derrick rental	3,161.25
Rig maintenance, repairs, and supplies	3,671.61
Fuel and water	389.10
District expense, insurance, etc.	1,253.74
Total	$25,359.61

CO$T Engineering

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

VALUATION

AUGUST 27, 1942

METHODS OF RECOVERY ESTIMATES

FEW oil operators with the exception of the major companies are experienced in estimating the true worth of their properties. Unlike most other businesses, it is not possible in the oil industry to make an inventory to determine what is left upon the shelves or in the warehouses. Inventories are made in the oil fields, but they include for the most part only physical equipment and not the stock in trade. The situation is analogous to a storekeeper who might count the number of shelves in his store but who has no idea of how much goods are left to sell.

Normally, when an operator finds it necessary to make an evaluation of one or all of his properties he calls in an expert, a consultant, to figure the reserves. This, of course, is the correct procedure, but not being experienced himself in the matter of computing reserves, the owner of the property seldom has the correct information available upon which an accurate estimate can be based. In addition, he is unable to verify or check the accuracy of the work of the hired expert.

As the gathering of data for the estimation of reserves must be carried on continuously throughout the life of the property, it is well that each operator take the next step and actually calculate his reserves. He thus keeps in better touch with the business and whenever he wants a check on his own reserve figures, because he is figuring on trading or selling the property, floating a loan, or for any other reason, he can call in an expert. The outside man then has a sound basis for his work and the operator already has a figure with which to check the final result.

There are three methods of computing oil reserves now commonly used. These are the comparison, decline-curve and volumetric methods. All should be familiar to oil operators since no one single method will suffice for all cases. All are quite simple in principle but in the application a great deal depends on the personal equation. There is no substitute for experience.

The accuracy of the comparison method is in direct ratio to the detail of the comparison. Ordinarily it is impossible to find two oil pools or properties which are exactly alike in every respect. Obviously it is worthless to compare reserves in pools merely because they produce from the same formation and are located in the same geological province. A comparison should consider the following points:

(1) Productive sand thickness; (2) type of trap (anticline, etc.); (3) initial potential; (4) gas-oil ratio; (5) type of drive (water, gas, etc.); (6) density of wells or spacing; (7) rapidity of depletion (prorated, etc.); (8) general appearance and character of sand.

Several rule-of-thumb methods of estimation have originated from the comparison of properties and experience gained from it. One of these is the multiplication by a factor, such as 1,000, of the initial potential of the wells or property. Another is to multiply by 12, or some other factor based on experience under similar conditions, the present established annual producing rate to obtain the ultimate remaining supply. The first of these is of doubtful value but the second has been used with considerable success. It applies, however, only when production has become established, i.e., after the peak production has passed and a normal decline has been reached.

Decline curves are very successful when a property has been produced long enough to establish a definite decline. Most operators will be satisfied with the simple type such as cumulative or time rate plotted on cartesian coordinate paper.

The rate-cumulative shows the rate of production for convenient periods, such as years or months, on the vertical scale plotted against accumulated production on the horizontal scale through the same periods. The advantage of this method is that ultimate recovery can be read directly upon the horizontal scale.

Time-rate curves are those which plot the rate of production against the time period. To determine ultimate recovery from these curves it is necessary to add the rates of production for all the future time periods.

Cartesian coordinates are more commonly used for the decline curves than the semilog or log-log coordinates principally because they are more universally understood. Semilog graphs are advantageous in that the decline curve is more often a straight-line curve and it is easier to project or forecast. Theoretically, log-log paper gives the most accurate results but some manipulation is required to obtain the proper straight-line decline curve.

The volumetric method is based upon core analysis. In using this method it should be remembered that the portion of the formation analyzed is extremely small in comparison to the total producing area. In many formations the physical properties are fairly constant and a single core may be representative of the entire pool or property. In other formations there are pronounced lateral and vertical changes and a great many cores will be necessary to obtain an estimate.

Most core-analysis companies return the analysis complete with calculated recovery per acre-foot under specified conditions. Calculations follow:

	Bbl.
Storage capacity of 1 acre-ft. at 15 per cent porosity	1,164
Less calculated water (30 per cent of above)	349
Less residual oil (12 per cent of above)	140
	675
Divided by formation volume factor (1.106)	519

This then is the maximum obtainable oil from 1 acre-ft. of pay sand. To obtain this oil requires production methods as efficient as those undergone by the core itself through water flushing and gas expansion. However, it at least provides a starting point to which the operator may apply whatever recovery factor his experience dictates. In many cases the recovery factor is applied directly to the total oil (815 bbl.), saving one step in the calculation.

Recovery factors under optimum conditions of initial water drive, etc., may be as high as 60 per cent. Normally, however, 30 per cent has been found to be a fair average for most pools. Using this factor, recoveries of 200 to 250 bbl. per acre-ft. may be expected.

All recovery estimates, being estimates, are subject to constant revisions. Properties should be reconsidered periodically to determine the reliability of the original work. Such revisions also show when a property begins to slip and may indicate repair work or other methods of production are needed.

Life of Heat-Exchanger Steel Is Extended by Relining

INSPECTION each time that an important refinery combination unit was down showed that the expected life of one heat exchanger was being seriously shortened by corrosion which was occurring uniformly around the shell but more pronounced at one end. The shell of the vessel was still relatively thick but due to the concentration of corrosion at the one end, the heavy wall seemed to offer little advantage except to delay the day on which the entire exchanger would have to be replaced. Obviously, this would be costly in normal times and doubly so under present conditions. The company engineers then consulted experts who were familiar with the art of relining pressure vessels and by using corrosion-resisting plate, the company men decided to proceed with the job.

First the exchanger shell was bored along its entire internal length. A portable boring bar was mounted across the open end of the shell, on which was mounted an air motor and gear box. A smooth surface of constant internal diameter

Interior of exchanger relined with strips of corrosion-resisting steel

was cut. Then $\frac{1}{8}$-in. runners of an noncorrosive metal were welded to the interior along lines which matched the wearing portions of the tube bundle. These runners were chosen and placed to take the wear caused by sliding the bundle in and out of the exchanger when repairs were to be made to the bundle.

Then the 4-in. strips of 12-gage, noncorrosive metal were welded in place between the runners and to the shell. These runners had previously been curved to the internal shape of the shell. As each was welded to the shell along its sides and ends a narrow crack was left between the two adjoining side welds to be filled with weld metal and to effect a final seal. With this completed, the liner was not only tightly secured to the shell along the sides and ends of each strip, but the shell was sealed as a continuous unit on the inside. A slight wire brushing smoothed off irregularities in the shell's surface and the bundle was then ready to be inserted.

Any evidence of oil seeping through a seam is now being watched and the operators suggest the use of plug welds with 3 to 4-in. centers over the entire surface of any liner if there is the slightest chance for seepage to take place.

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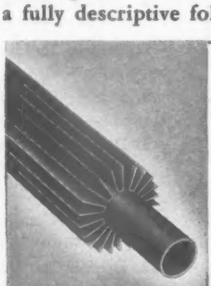

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REFINERY ACTIVITY AND EXPANSION

Procedure For Converting Refining Equipment To Produce War Materials Outlined by OPC

WASHINGTON, D. C.—Specific procedure for nation-wide conversion of existing petroleum refinery equipment from the production of peacetime derivatives of crude oil to the large-scale manufacture of war materials was announced here last week.

The program was outlined by Bruce K. Brown, assistant deputy in the Office of Petroleum Coordinator, under whose direction the conversion is to go forward. Mr. Brown's statement, set up for the guidance of the industry, follows:

Main Considerations

"1. For the purpose of this program, the word, "refinery" is used as applying equally well to natural-gasoline plants, or to any other petroleum-product manufacturing equipment which is available in the industry, and useful for the purpose intended.

"2. In view of the great public interest in specific processes sponsored by various individuals and companies, we think it appropriate to state at this time, that as we envisage the program it will embody two main types of process:

"A. The revision of petroleum-refinery equipment using existing cracking units as nuclei for the production of war products, and other existing refinery equipment as nuclei for the various purification steps involved.

"B. The utilization of equipment available in the natural-gas and gasoline industry for the production of war products and for the purification of such war products.

"3. Catalytic processes for the production of butadiene from butane appear to us to be adaptable to the refinery-conversion program and we anticipate receiving and approving proposals of this type as well as proposals involving the conversion of cracking units.

"4. This office is willing to give informal advice which may be of help in completing proposals and will be glad to receive advance information as to proposals in course of preparation. However, no decision can be reached by this office as to any specific proposals until it is complete and no effort will be made to 'save a place' in the program for any refiner who is delayed, for any reason, in submitting a complete proposal.

"5. Particular attention is called to the fact that the bottleneck in the refinery-conversion program will probably be the availability of existing equipment to purify the products rather than the availability of equipment to make them. Strenuous technical effort is being expended to attempt to improve the situation with respect to purification of products including butadiene, benzene, and toluene. Proposals relative for the purification of products are just as important, perhaps more important at the present time, than are proposals to make such products, and refineries are invited particularly to look into the possibility of entering the program from the standpoint of the purification of products made by others.

"6. Many of the larger refineries are already busy on plans for the production of war products. While they will be able to contribute to the present refinery-conversion program and perhaps may be able to submit acceptable proposals very rapidly, OPC particularly desires to receive proposals from small refiners.

Various Programs Coordinated

"In recent weeks, a number of letters and reports have been circulated from this office and the technical advisory committee of the synthetic rubber committee of the Petroleum Industry War Council relative to the production of components for the manufacture of 100-octane aviation gasoline and 'quick' synthetic rubber. The urgent demand of these two final products and for toluene is such that complete coordination of the various programs could not have been achieved at an earlier date without undesirable delay.

"Unfortunately, it is not yet possible to establish a rigid order of precedence for butadiene and accompanying products, ethyl benzene, cumene, codimer, and isobutylene or diisobutylene. On the other hand, there will not be conflicts in many cases. It is suggested that potential participants in the program apply the following generalizations when considering the application of the various processes to their situations:

"A. Present production and presently planned increases in production of 100-octane aviation gasoline components should be maintained.

"B. The 100-octane aviation gasoline construction program, if any, should not be interfered with, but it is permissible and desirable to convert existing equipment to produce codimer, diisobutylene, or ethyl benzene until such time as the new aviation equipment is started.

"C. Temporary operations for periods of as little as 6 months are desirable.

"D. Existing catalytic polyermization plants now in operation and not at present allocated to cumene production should be converted to codimer operation as described in our letter of July 13, 1942.

"E. Refiners not utilizing present production of isobutylene to make 100-octane aviation-gasoline components should consider the installation of a cold acid extraction plant as described in our letter of July 9, 1942, subject to the limitations of from A to D above. Consideration should also be given in such cases to delivering the C_4 fraction or mixed C_3 and C_4 fraction to a nearby refinery already operating a catpoly, corld acid, or alkylation plant.

"F. Existing shutdown thermal cracking units not presently planned for use in the butadiene program should be considered for conversion to the production of ethyl benzene in accordance with the technical advisory committee's report dated July 27, 1942.

"All of the processes in question are vital to the war effort, but immediate action is required if the maximum effect is to be achieved. This office,

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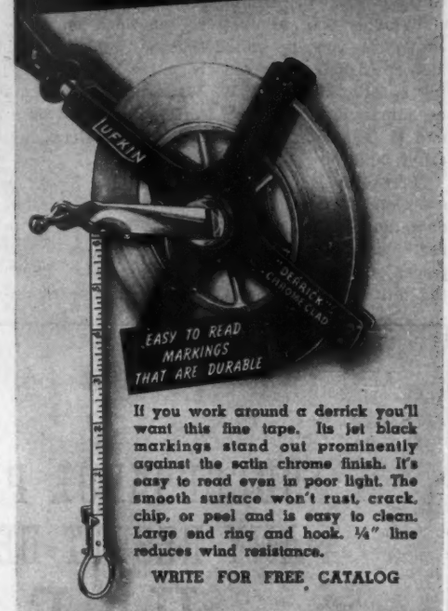

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therefore, urges all who can participate to respond promptly by sending proposals (four copies) to the Director of Refining, Office of Petroleum Coordinator for War. It is our belief that satisfactory business arrangements can and will be worked out in the near future.

"While all communications should be addressed to the director of refining, for the benefit of those individuals who are actively at work on these projects it may be stated that our refining division specialists are presently active in the following specific fields: D. W. Wilson, butadiene and accompanying products; R. B. Cragin, cumene; and E. B. McConnell, codimer, diisobutylene, and ethyl benzene.

"Proposals should describe the projects as completely as possible, including the completion date, daily production, effect on other refinery operations present and future, and a list of major pieces of equipment available at the point where the unit is to be located, those available second-hand from other sources, and those which must be obtained new. The latter must be minimized. At the same time the proposal is submitted, a regular priority application should be filed. It will receive prompt attention by the construction section, refining division. It is important to list the old and new equipment to be used in as much detail as possible even though it is necessary in some cases to make rather free estimates.

"Refiners already producing any of the materials in question, other than cumene and butadiene, are requested to give this office a report on the source, daily production, and present disposition."

Detailed recommendations from industry committees for conversion of certain facilities to achieve the maximum production of butadiene, ethyl benzene, codimer, isobutylene, and diisobutylene were outlined in The Oil and Gas Journal August 6.

OPC policy with respect to refinery conversion was outlined by Deputy Coordinator Ralph K. Davies, who said:

"Three highly important advantages will be gained by these conversions. First, we shall be able to obtain quickly a very considerable increase in our production of materials necessary to the successful prosecution of the war. Second. we shall do it almost entirely with equipment which is already manufactured, thus reducing to a negligible degree the amount of new critical materials that will be required. Third, we shall make it possible for a considerable number of small operators to get into the war-production program.

"In keeping with the well-established policy of this office, we shall expect each participant in the program to make his own selection of the processes he proposes to use. We are prepared, within reasonable limits, to criticize plans which are submitted, and to offer suggestions for improvement. But the fundamental responsibility for the selection of a process must remain with the company submitting the proposal.

"We shall expect each participant to submit his own proposal, bearing in mind that no projects will be approved except those which will use an absolute minimum of anything other than existing equipment.

"It will be the policy of the OPC to give fair treatment to each general type of process, giving consideration to the fact that, regardless of the merit of any specific proposals received from anyone, it will be necessary that we produce certain minimum quantities of each of these essential products as a part of the program.

"Time is precious, and it will, therefore, be the policy of the Office of Petroleum Coordinator to recommend, for immediate adoption, such refinery-conversion proposals as are received in acceptable form and are found by us to be worthy of such recommendation."

●

Priority Rating of AA-4 Assigned Associated Plant

Associated Refineries, Inc., a corporation established a few months ago for the purpose of building an aviation-gasoline plant in southern Oklahoma, has been assigned priority ratings for the necessary materials and preliminary work on the project is under way. Stock in Associated Refineries is held by eight North Texas and southern Oklahoma refiners, including Anderson-Prichard Refining Corp., Bell Oil & Gas Co., Ben Franklin Refining Co., Cosco Oil Co., La Salle Petroleum Corp., Panhandle Refining Co., Rock Island Refining Corp., and W. T. Waggoner Estate, refining department.

Frick-Reid Supply Corp., Tulsa, has the construction contract with the Universal Oil Products Co., Chicago, as consultant.

The cooperative aviation-gasoline plant will be one of the first units of its type constructed. Charging stock will be drawn from operating refineries of the eight stockholders for processing in a central unit. The plant will cost approximately $10,000,000.

Much of the equipment necessary for the plant has been ordered under the priority rating of AA-4 assigned to the project.

Standardized Designs Proposed

WASHINGTON, D. C. — The War Production Board has appealed to all contractors engaged in refinery and synthetic-rubber plant construction to use, in so far as possible, only equipment of standard design.

Howard Coonley, chief of the Simplifications Branch of the Conservation Division, in letters to designers and constructors of oil refineries and synthetic-rubber plants, pointed out that almost all materials used in this construction are on the critical list.

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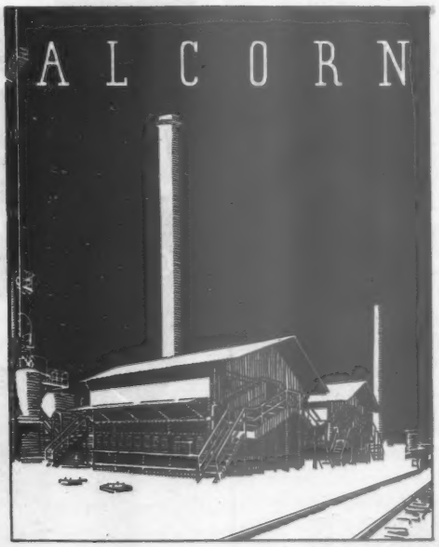

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The results of this survey show how the specification of Atmospheric Cooling Towers speeds both your war production—and the Nation's. It shows how the delivery time of Atmospheric Cooling Towers is three times faster than other types. It shows how tremendous the savings of critical materials, such as steel and brass, can be in an Atmospheric Cooling Tower. It shows how thousands of man-hours required for the manufacture of towers of Mechanical Draft Types can be diverted to more vital war work by specification of Atmospheric Cooling Towers. It shows how the machine-hours and man-hours going into secondary items, such as fans, gears, switches and motors, required by Mechanical Draft Towers, can be used elsewhere in the war effort because they are not required in an Atmospheric Cooling Tower.

This factual survey takes on added importance when you realize these savings can be made without any sacrifice—for in three cases out of four an Atmospheric Cooling Tower renders service and thermal efficiencies identical with those of Mechanical Draft Towers.

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Pipe-Line Activity

Reversal of East Texas Outlets For War Program Is Discussed

For feeding the Longview, Tex., end of the 24-in. 550-mile War Emergency crude-oil pipe line on completion late in the fall as well as for feeding a possible Longview-Memphis products line a number of proposals have been discussed which may require the reversal of several lines serving as outlets for the East Texas field. Among these are the Pan American, Texas-Empire and Shell systems between East Texas and the Gulf Coast.

The Pan American line of 10-in. and 12-in. has a capacity of 56,000 bbl. daily when shipping East Texas crude and 45,000 bbl. daily when shipping Cayuga crude.

The Texas-Empire 215-mile trunk line with rated daily capacity of 72,000 bbl. belongs to Texas-Empire Pipe Line Co. of Texas; this company is now owned by Cities Service and Tide Water Associated interests. Late last year arrangements were completed by which Texas interests disposed of holdings in Texas-Empire Pipe Line Co. of Texas to Tide Water Associated. Texas and Cities Service interests continue to own Texas-Empire Pipe Line Co. of Delaware which has a system extending from Oklahoma and Kansas to northern Illinois.

Standard Oil Pipe Lines Set New Shipping Records

Crude-oil deliveries through nine eastern pipe lines formerly in the Standard Oil group reached a new high in the first 7 months of 1942 as well as a new high for July.

Efforts to increase shipments of petroleum products to the Atlantic seaboard are chiefly responsible for the record movement through these carriers.

Crude-oil deliveries in the first 7 months totaled 196,500,000 bbl., an increase of 30 per cent from the corresponding period a year earlier. Movement in July totaled 31,700,000 bbl., an increase of 9.4 per cent from June, and 23 per cent from July 1941.

Project 3 Shipments to Go By Pipe Line and Tanker

Arrangements have progressed for moving 15,000 bbl. of products for Project 3 to the East Coast. The principal feature of this project is the construction of the Fostoria-Akron, Ohio, line which has been authorized by OPC, according to a recent announcement by Ralph K. Davies, deputy petroleum coördinator.

In connection with this program, Shell Oil Co., Inc., is building a new pump station at Muncie, Ind., to increase the capacity of its pipe line between Zionsville, Ind., and Lima, Ohio, from 15,000 to 23,000 bbl. per day.

As another part of this program, Standard Oil Co. (Indiana) will arrange a connection between its Whiting-Indianapolis, Inc., products line and Shell's products line at Zionsville, Ind. Standard will provide, by sale or other method, for transporting through its pipe line 8,000 bbl. of gasoline daily to Shell's line for delivery at Lima, Ohio, to Standard Oil Co. of Ohio.

Until the Fostoria-Akron line is built, the plan is to make shipments for Project 3 from Lima to Toledo, Ohio, for transshipment by lake steamer or barge to Cleveland, Ohio. Sohio Pipe Line Co., subsidiary of Standard Oil Co. of Ohio, has been asked to connect its Cleveland-Akron products line with the Sun-Susquehanna system at the Randolph station, near Akron, Ohio. Capacity sufficient to transport 15,000 bbl. of products daily from Cleveland to Randolph station can be made available in these pipe lines, supplemented by transport-truck facilities, if necessary. The Sun-Susquehanna system, extending from Cleveland and Akron, Ohio, to Newark, N. J., will move and reconstruct pump stations in Ohio and Pennsylvania and reverse pipe lines. The 15,000 bbl. per day of products to be transported by this plan may belong to any one or more of the companies mentioned or such products may be owned and transported for others.

The Project 3 program has been approved by David M. Hudson, acting chief counsel, OPC, as well as by Deputy Coordinator Davies. Chairman of Project 3 is S. S. Smith, Shell Oil Co., Inc.

Socony-Vacuum Lays Crude Line From Ritz to Lindsborg, Kans.

Socony-Vacuum Oil Co., Inc. (White Eagle Division) is laying a 15-mile 4-in. crude-oil line from Ritz to Lindsborg, Kans. This year a 3-in. line was laid from Lindsborg to serve the Bay Petroleum Corp. refinery at McPherson, Kans.

Plantation Extension and Expansion Projects Progress

Arrangements for the northern extension of the Plantation line are being worked out in more complete detail in New York by the pipe-line managing subcommittee representing the petroleum industry.

It has been agreed, said Deputy Coordinator Ralph K. Davies, that the extension should be undertaken as a government project. As soon as the industry group completes its work, negotiations will be initiated with the appropriate federal agency looking to an agreement whereby the Government will finance the estimated $3,000,000 cost.

The extension from Greensboro, N. C., to the Richmond, Va., area will require about 165 miles of second-hand 8-in. pipe, which it is believed can be obtained by digging up and reconditioning existing lines now either idle or only in partial use. Pipe-line engineers estimate that the actual laying of the line could be completed in less than 100 days after the necessary materials are obtained.

Most of the refined products moved to Richmond via the extension would be transshipped by barge to such points as Washington, D. C., Baltimore, Philadelphia, and Trenton. The remainder should be consumed locally in the Richmond area.

Meantime, work is already well under way on two related projects designed to increase the capacity of the Plantation line to Greensboro, N. C., from 60,000 to 90,000 bbl. daily, thus making available at Greensboro the 30,000 bbl. that would be piped on to near Richmond. These involve construction of a 60,000-bbl. feeder line from Beaumont, Tex., to Baton Rouge, La., Plantation's southern terminus, and the installation of intermediate pumping stations on the Plantation line proper.

Preparations have been made for construction of the 260-mile Beaumont-Baton Rouge feeder,

Pipe-Line Personalities . . . . . S. W. Day

S. W. DAY, vice president, Standard Oil Co. of Louisiana, and general manager of the company's pipe-line department with headquarters at Shreveport, La., progressed to his present position through experience with all phases of pipe-line activity. In fact he has performed practically every kind of task in the construction and operation of the transportation facilities with which he is connected.

After having some experience in the oil fields of Pennsylvania, Mr. Day came to Louisiana and started with Standard Oil Co. of Louisiana as a common laborer in 1905. His rise was steady and promotions carried him from one position to another as he went to high executive posts. Following a period in which he was connection foreman directing the work of the large gangs which were employed at that time for the laying of screw pipe, he became district foreman in the Caddo field, Louisiana. Later he held a similar position in the Bull Bayou field, Louisiana. From this he was promoted to superintendent of gathering lines for the company's pipe-line system.

In 1923 the operations of Standard Oil Co. of Louisiana were reorganized and the newly organized Standard Pipe Line Co. of Louisiana assumed responsibility for pipe-line facilities, under the direction of F. Ray McGrew, president, and Mr. Day, vice president. When the pipe-line company was dissolved in 1936 and the pipe-line facilities reverted to the Standard Oil Co. of Louisiana organization, Mr. Day was named assistant manager working under Mr. McGrew. A short time afterwards he became manager of the pipe-line department. When Mr. McGrew retired in May 1937, after 33 years of service with the organization, Mr. Day succeeded him as head of the department.

known as Bayou Pipe Line System. Construction work on the 8-in. starts first. Work on the 10-inch will start about September 1. Bids have been received on the additional pumping stations for Plantation.

Construction Proceeds on El Dorado-Helena Line

Practically all of the right-of-way has been purchased and more than half of it has been cleared for the 158-mile 10-in. El Dorado-Helena, Ark., line of used pipe being laid by Gulf for Project 5. Pipe is being shipped to the job from several points including the Gulf-Magnolia crude-oil line which is being taken up between Panhandle and Ranger, Tex. Pipe from the Gulf-Magnolia line is being used for several projects. Construction started at the Helena end of the line and later at the El Dorado end.

The El Dorado-Helena line is part of Project 5 for moving products from the Gulf Coast to Helena, Ark. The project includes utilization of certain crude-oil pipe-line facilities of the Gulf, Texas and Magnolia organizations. Texas Pipe Line Co. is taking back the line leased to Arkansas Fuel Oil Co., extending from Nort Neches, Tex., to Bossier City, La., and is using this line for Project 5. A 15-mile extension from Bossier City to Benton, La., is being built to connect with the Magnolia's crude line which will be converted to products service and reversed between Benton, La., and El Dorado, Ark. The Gulf organization has been filling in between loops so as to double the section of its line between Lufkin, Tex., and Dubberly, La. This will make it possible to have continuous pipe-line facilities for moving products from the Gulf Coast to feed the El Dorado-Helena line.

Preparations for Reversing Eastern Lines Proceed

Tuscarora Oil Co., Ltd., has completed several stations in connection with reversal of line. Sites are being selected for other stations and bids are being circulated for construction of buildings. Tanks at Bayonne, N. J., refinery are being dismantled and made ready for shipment to the Negley, Ohio, station, the western terminus.

National Transit Co. has completed testing and reconditioning 10 miles of 8-in. pipe, which has been looped into its Millway-Centerbridge line in Pennsylvania.

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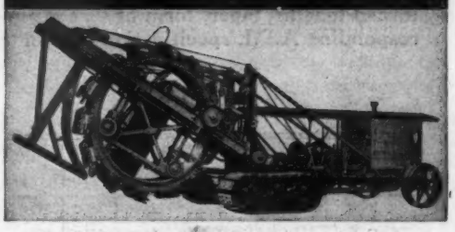

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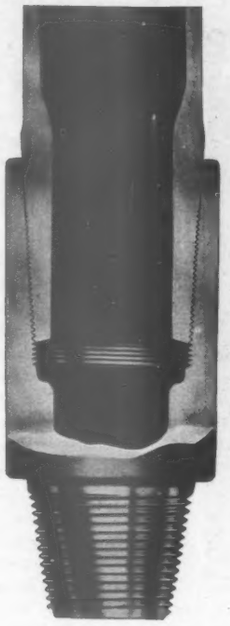

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"Pittsburgh Special Double Grip" External Upset-Internal Flush Drill Pipe with Mating Tool Joint.

GENERAL DIMENSIONS

TABLE A

Size	2⅜"	2⅞"	3½"	4½"	5⅝"	6⅝"
A	2.506"	3.006"	3.631"	4.631"	5.694"	6.756"
B	1"	1¼"	1½"	2¼"	2¾"	3½"
C	3¼"	3¾"	4¼"	5½"	6¾"	7¾"
Standard Length	16"	17"	18"	20"	22"	24"
Net. Wt. lbs.	27	34	41	74	122	159

TABLE B

Size	3½"	4½"	5⅝"	6⅝"
A	3.631"	4.631"	5.694"	6.756"
B	2 7/16"	2 13/16"-3" 3 5/32"	3 13/16"-4"	5"
C	4⅝"	5¾"	7"	8"
Standard Length	18"	20"	22"	24"
Net Wt., lbs.	53	83	122	156

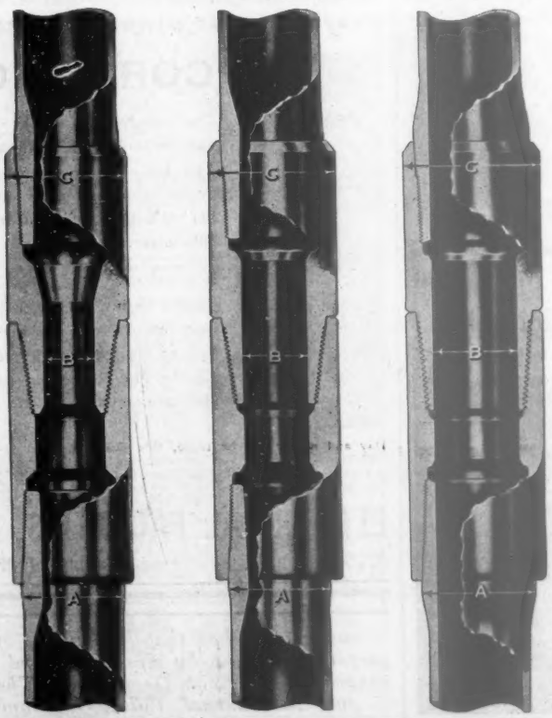
TABLE C

Size	2⅜"	2⅞"	3½"	4"	4½"	5⅝"	6⅝"
A	2.787"	3.349"	3.955"	4.631"	5.131"	6.193"	7.256"
B	1¾"	2¼"	2 11/16"	3 5/32"	3¾"	4 13/16"	5 29/32"
C	3⅜"	4⅛"	4¾"	5¼"	6⅛"	7⅜"	8½"
St'd L'gth	16"	17"	18"	20"	20"	22"	24"
Net Wt. lb.	25	37	51	83	89	129	163

Regular A.P.I. Tool Joint with "Pittsburgh Special Double Grip" Pipe Threads (See Table A)

A.P.I. Full Hole Tool Joint with "Pittsburgh Special Double Grip" Pipe Threads. (See Table B)

External Upset-Internal Flush Tool Joint with "Pittsburgh Special Double Grip" Pipe Threads. (See Table C)



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Thread dimensions, lead, taper and form of threads conform with regular A.P.I. Specifications in the different pipe sizes, plus special features. Available in either internal upset or external upset—internal flush.

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FIELD DEVELOPMENTS...

HIGHLIGHTS FROM THE WEEK'S NEWS—

In considering the discovery of new reserves certain rather obvious facts are sometimes overlooked. From the standpoint of immediately available oil reserves it makes little difference whether new reserves are added by discoveries, extensions or new and deeper sands. From the standpoint of future additions to reserves, the classification of new reserves is of great importance.

Actually, a rather detailed breakdown of new reserves can be used to chart the future course of the industry. Extensions are possible only to the point where the top of the pay passes below the water table or to a point where two adjoining pools merge. The possibilities along this line are, therefore, sharply limited and in the great majority of fields are fully developed within a year or so of the time of discovery of the field.

Deep sands may be found over a longer period and, in some areas, such as the Gulf Coast and California they may be found over a period of many years as the deep-lying sediments which may contain oil extend downward for at least three times the maximum present record drilling depth. This leads to an oft-expressed belief that deep drilling can add an indefinite quantity to present reserves. Actually, much of the Mid-Continent and most of the eastern fields are now being drilled to the greatest depth at which there is reason to hope for major discoveries. Even in West Texas, there is a constant increase in the number of tests carries to Ellenburger and each such test diminishes the number of deep discoveries possible.

In Kansas and Oklahoma, the Ordovician is also the objective of most wildcats. In the Rocky Mountain area it is hoped that pre-Pennsylvanian formations will produce large quantities of oil but this hope is based largely upon Kevin-Sunburst, which lies close to the Canadian border and may be near the southern limit of pre-Pennsylvanian production. In the Louisiana-Arkansas area, there may be pays below the Smackover lime, but drilling is nearing the highly metamorphosed Paleozoics which mark the probable lower limit of production. No showings have been found to date below the Smackover but this possibility cannot be ruled out until the granite or schist is plentifully peppered with tests.

The quantity of oil to be discovered by deeper drilling in known pays is larger than the quantity to be obtained from extensions to present fields but it is by no means unlimited and each deep pay found brings closer the exhaustion of this possibility. Hopes for major discoveries are, thus, being centered to an increasing degree on new fields and the record of the past few years is not encouraging in this regard, both from tests bordering known areas and rank wildcats.

SOUTHWEST TEXAS: A prospective Wilcox pool opener in the Berclair area, Bee County, is shut down due to excessive pressures encountered. A new gas-distillate field is indicated in the Premont area of Jim Wells County and the South Campana field, McMullen County, was extended to the southeast (p. 82).

EAST TEXAS: Oil production for the Waskom gas-distillate field was assured by a test on the flank of the structure which flowed at the rate of 40 bbl. in 15 hours. The first dry hole has been completed in the Coke Paluxy sand pool, Wood County, and two Smackover tests have been started on the north edge of the Tyler-Woodbine basin (p. 84).

NORTH LOUISIANA: Two wildcats in La Salle Parish have recovered oil shows in the middle Wilcox sand and are in the process of testing. A prospective pool opener in Morehouse Parish is shut down after flowing oil and salt water on a recent test (p. 100).

ILLINOIS: Trenton exploration on the southwestern edge of Illinois has resulted in the discovery of a new Trenton field in St. Clair County. Two offsets to the St. Jacob pool have been started and a former dry hole has been completed as a good Aux Vases well in Wayne County (p. 88).

NORTH CENTRAL TEXAS: A second Simpson pool has been opened in the Fort Worth basin of Montague County and a new Canyon sand pay zone was found in the Anzac-Morris field, Coleman County. The first Ellenburger production for the eastern half of Stephens County was indicated at a test north of the town of Caddo (p. 84).

KANSAS: A new Lansing lime pool has been opened between the Hall-Gurney, Gorham and Russell pools, Russell County, and another Russell County wildcat extended the Russell pool. An offset to the Sun City discovery found the pay zone dry (p. 86).

TEXAS GULF COAST: Wildcats in three Texas Gulf Coast counties are showing for pool openers and important extensions have been assured the new Stewart field, Jackson County (p. 91).

OKLAHOMA: A Logan County wildcat in the Guthrie townsite recovered oil on a drill-stem test of the Simpson dolomite and also reported oil shows in the Wilcox sand. A plugged-back well in the Doyle pool, Stephens County, has opened a gas-distillate zone for the field and a wildcat in Okfuskee County extended the East Cromwell pool 1½ miles to the east (p. 83).

PERMIAN BASIN: A new pool was opened between the West Fuhrman and Mascho pools, Andrews County. It is believed to be a south extension for West Fuhrman and may link the two pools. A new pay zone has apparently been opened in the Fullerton pool and a Crane County wildcat is reported to be running unusually low on structures (p. 97).

CALIFORNIA: A well in the Ventura Avenue field has opened several hundred additional feet of oil sand to production and a test on the Ramona anticline, Ventura County, has been successfully completed (p. 92).

COMPLETIONS IN ALL FIELDS . . .

(Week Ended August 22, 1942)

	Oil	Gas	Dry	Total	Footage	Ttl. comp. to date 1942	Ttl. comp. to date 1941
N. Y., Pa., and W. Va.	41	17	3	61	161,387	2,306	3,777
Ohio	7	12	11	30	65,531	696	1,052
Indiana	2	1	2	5	9,782	228	332
Kentucky	1	1	0	2	4,307	197	406
Illinois	26	0	24	50	130,765	1,121	2,160
Michigan	10	3	5	18	50,198	465	549
Kansas	15	3	16	34	104,113	1,012	1,413
Nebraska	0	0	0	0	0	25	64
Missouri, Iowa	0	0	0	0	0	10	25
Oklahoma	5	1	11	17	52,720	808	1,202
Texas:							
North Central Texas	5	1	8	14	49,619	766	1,723
West Texas	25	0	2	27	102,171	968	1,395
Texas Panhandle	1	0	0	1	3,222	264	389
Eastern Texas	3	1	2	6	28,058	268	688
Texas Gulf Coast	4	0	2	6	44,506	510	699
Southwest Texas	5	0	8	13	63,342	766	1,157
Total Texas	43	2	22	67	290,918	3,542	6,051
North Louisiana	5	0	4	9	36,960	316	433
Louisiana Gulf Coast	3	0	5	8	67,722	353	567
Total Louisiana	8	0	9	17	104,682	669	1,000
Arkansas	1	0	3	4	20,580	108	119
Mississippi and Southeast	0	0	0	0	0	48	163
Montana	1	7	3	11	15,026	128	177
Wyoming	2	0	2	4	21,383	67	123
Colorado, Utah	0	0	0	0	0	11	24
New Mexico	2	0	2	4	17,269	181	195
California	7	0	0	7	44,504	490	726
Total United States	171	47	113	331	1,093,165	12,112	19,558
Total previous week	152	39	91	282			
Week ended Aug. 23, 1941	476	61	181	718			

Smackover Lime Wedge-Edge Searched for Oil Deposits

By ROBERT INGRAM

BELIEF that deep, hidden formations under the Tyler-Woodbine basin in eastern Texas contain important reserves of oil within easy reach of the drill has brought about a regional campaign of exploration. Chief objective in this search for new reserves is the Smackover lime formation. Two facts have already been established: (1) That the Smackover lime is a blanket formation underlying most of the Tyler basin, and (2) that it carries oil under proper structural and textural conditions.

This much is known in spite of the fact that nowhere does the Smackover formation outcrop at the surface and produces no oil in Texas. In many presently producing areas the Smackover probably lies so deep that it is out of present range of the drill. Yet millions of dollars are being spent in an exploratory campaign still in its preliminary stages around the margins of the basin.

Surface geology long ago established the outlines of the Tyler-Woodbine basin, approximately in the center of eastern Texas which is bounded by the regional features of the Sabine uplift on the east, the Bend arch on the west, and the Ouachita mountains on the north. To the south it widens and dips toward the Gulf of Mexico.

Early development in the basin, highlighted of course by the discovery of the East Texas field on the flank of the Sabine uplift, was relatively simple. Structural conditions could be studied from outcrops on the western side of the basin, and surface indications of structure were plentiful, although the East Texas field itself was a stratigraphic trap, not indicated on the surface.

Since the Trinity group overlies the Paleozoics along the Bend arch, and also was found just above granite in some of the shallower portions of the basin, little thought was given to what might be found below the Trinity in the center. Woodbine sand continued to be the main objective and deep exploration meant the Paluxy, Glen Rose, and Rodessa.

But in 1936, the discovery of big production in the Trinity group at Rodessa, and the coincident discovery of Trinity group pays at Talco, and a fault-line structure at the northern end of the Tyler-Woodbine basin, set geologists to thinking about what might be below that. In addition, a more complete picture of the Tyler basin began to form.

A neck of the Tyler basin leads into southwestern Arkansas, turning east around the north edge of the Sabine uplift just about at the point of the tristate Rodessa field. Here there is an abrupt drop in the Paleozoic basement along an east-west line through Hempstead County, Arkansas. It was quickly recognized that this break provides an ideal condition for accumulation of oil, either in a faulted trap or a true shoreline trap, and tests south of the break soon established that porous formations lie below the Trinity and pinch out before reaching the surface.

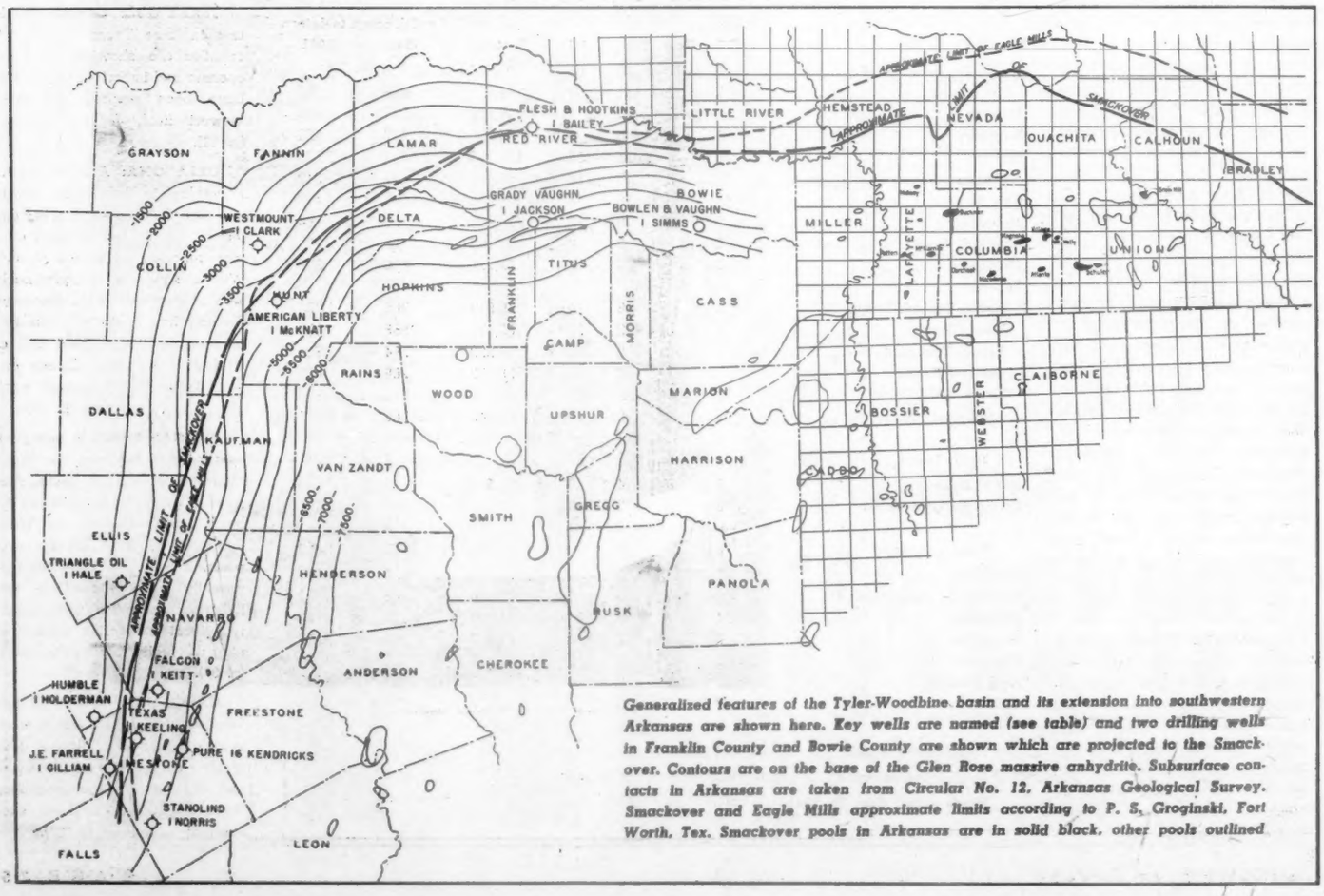
This break is not the well-defined and well-known continuance of the Mexia-Balcones fault system which dominates the Talco and Sulphur Bluff fields and the Mexia group of fields in the southwestern part of the Tyler basin. It does, however, run roughly parallel to this system some miles to the north and about the same distance to the west where the system swings almost due north and south.

In May of 1936, Phillips Petroleum Co. 1 Reynolds, on the north edge of the Smackover field, found production in the upper section of the Smackover lime (since named the Reynolds section) and opened the Snow Hill pool. The discovery of Schuler followed, then Buckner, Magnolia, Village, and Atlanta in regular succession.

Remarkable was the fact that these discoveries represented 100 per cent success in wildcatting—for each wildcat drilled, a Smackover pool was opened. Drilling, of course, was on structures located geophysically or otherwise defined, and the percentage of success, coupled with the large production and reserves from Smackover reservoirs, made that zone a highly attractive objective.

Thus was started the "Smackover trend play" in southwestern Arkansas which has continued up to the present with success, though less spectacular than that of the initial wildcat campaign.

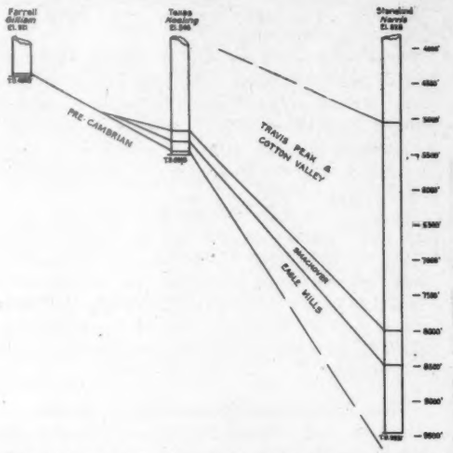
As the Smackover exploration moved to the north edge of the Arkansas neck of the Tyler



Generalized features of the Tyler-Woodbine basin and its extension into southwestern Arkansas are shown here. Key wells are named (see table) and two drilling wells in Franklin County and Bowie County are shown which are projected to the Smackover. Contours are on the base of the Glen Rose massive anhydrite. Subsurface contacts in Arkansas are taken from Circular No. 12, Arkansas Geological Survey. Smackover and Eagle Mills approximate limits according to P. S. Groginski, Fort Worth, Tex. Smackover pools in Arkansas are in solid black, other pools outlined

basin, new conditions were found which slowed exploration on that side. A graben extends along an arc, roughly running through the center of this part of the basin. Because the first wells drilled north of this fault found extremely low permeability and a general tightening of the formation near the fault zone, many geologists gave up hopes of finding production north of the fault.

Key well for this discouraging belief was one drilled by E. H. Moore of Tulsa which went 40 ft. into the top of the lime from 7,270-7,310 ft. and



Cross-section of the Smackover formation on three key wells illustrating the approximate pinch out. Data on the Texas 1 Keeling are unofficial

failed in attempts to open the tight formation even after treatment with 10,000 gal. of acid.

Knowledge of the section below the Trinity as found in the Arkansas wells, plus subsurface knowledge of the Tyler basin from many years of drilling in both fields and wildcats (see The Oil and Gas Journal, May 28, 1942, p. 82) gave a good idea of where the Smackover could be reached by the drill in the Tyler basin if present.

Humble Oil & Refining Co. had already drilled a test in Hill County in 1935 (see table), found that the Smackover pinched out east of that point. Then, in 1938, Pure Oil Co. drilled a deep test in the Mexia field and Stanolind Oil & Gas Co. drilled north of Kosse, both in Limestone County, finding Smackover sections. Thus the zone of Smackover pinchout was narrowed to relatively few miles.

By this time two types of play were getting under way—one, in which the Texas Co. took the lead, in search of a true stratigraphic and possible shore-line trap; the other, exploring structural traps. Leasing began slowly based on a combination of existing subsurface geological information and extensive geophysical work.

Geophysics was applied to the shore-line search by determining shots off the Smackover lime and tracing that formation until it pinched out. This work, of course, required careful checking against drilling data, and is usually rechecked after every new Smackover test in the area is completed. At the present time the district is one of the most active geophysical areas in the country.

Other companies stayed with the traditional structural type of prospecting, took advantage of known structures where the Smackover could be expected to come in reasonably shallow (e.g., Pure's test at Mexia) and of other structures defined by geophysics.

This campaign was already well under way by last December when another Smackover discovery, again in southwestern Arkansas, set off a red-hot leasing boom. This was the opening of the Midway pool in Lafayette County, Arkansas, north of the graben and on the north edge of that part of the basin. While Midway is a structural trap, the fact that good production was

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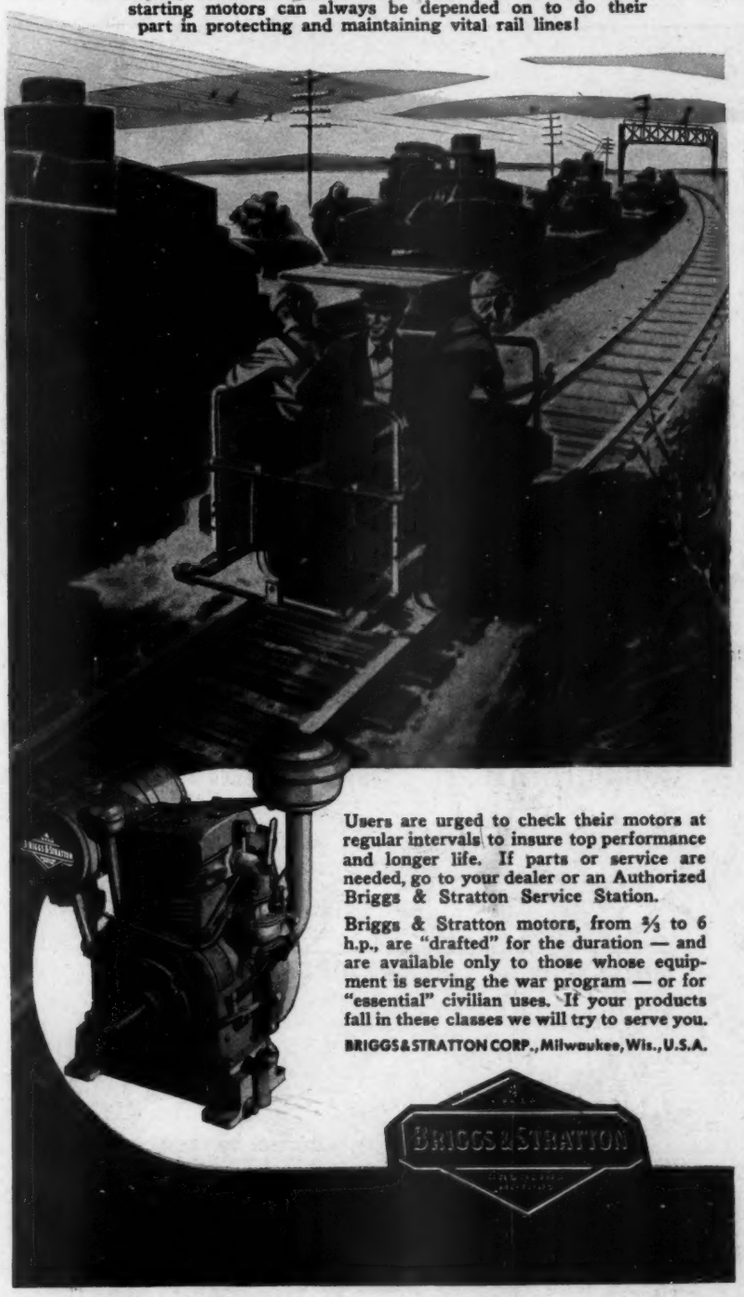

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KEY WILDCATS IN SMACKOVER SHORE-LINE SEARCH

Well, location	Elev. (ft.)	Smackover (ft.)	Eagle Mills (ft.)	Paleozoic or pre-Cambrian (ft.)	Total depth (ft.)
Limestone County:					
Stanolind 1 Norris, K. Thrasher Sur., 5 mi. north of Kosse; comp. 4-15-38	528	8,525-8,995	8,995-9,951	.....	9,951
Pure 16-T Kendricks, P. Varella Sur., Mexia field; comp. 2-2-38	519	8,763-8,847	.....	.....	8,847
Farrell 1 Gilliam, J. Spencer Sur., 2 mi. west of Mart (McLennan County); comp. 10-16-41	521	Absent	Absent	4,865	4,869
The Texas 1 Keeling, A. Whitaker Sur., 6 mi. southwest of Cooledge; comp; 5-30-42	546	5,741-(?) (reported)	(?)	6,012-6,018	6.018
Hill County:					
Humble 1 Holderman, C. Sullivan Sur., 1 mi. west of Montcalm; comp. 4-1-35	657	Absent	Absent	3,398	3,398
Navarro County:					
Falcon Co. 1 Keitt, S. Benton Sur., 10 mi. west of Currie; comp. 8-15-42	486	6,151-6,438	6,438-6,455	.....	6,455
Ellis County:					
Triangle Oil 1 Hale, Benj. Smith Sur., 1¾ mi. west of Avalon; comp. 1-22-31	452	Absent	Absent	.....	3,190
Hunt County:					
American Liberty 1 McNatt, Enos Murphy Sur., 4 mi. west of Greenville; comp. 6-25-42	573	6,662-6,696	6,696-6,880	6,880-6,895	6,895
Westmount 1 Clark, W. H. Williams Sur., 1 mi. northwest of Celeste; comp. 12-7-39	677	Absent	Absent	4,685-5,314	5,314
Red River County:					
Flesh & Hootkins 1 Bailey, J. Robbins Sur., 1 mi. west of Bagwell; comp. 11-16-39	446	Trace approx. 3,300	.....	3,360-65	3,378

found in the northern area removed doubts about possibilities due to tightness of the formation and gave tremendous support to the search on the west edge of the basin in Texas.

Leasing began in earnest along a 200-mile path north from Falls County, Texas, through Hunt County and east to Arkansas. By midyear an estimated 2½ million acres had been taken up in blocks varying from 5,000 acres to 75,000 acres almost solid. The Texas Co. alone holds an estimated 300,000 acres in the area, and the Magnolia Petroleum Co. has some 100,000 acres. Some 25 other interests hold lesser acreage of more than 5,000 acres, and many smaller spots have been taken up by individuals.

Three wildcats were drilled during the first half of the year, Texas 1 Keeling, American Liberty 1 McNatt and Falcon Co. 1 Keitt. Each well found a Smackover section, and the Falcon well found good porosity and salt water in the section suggesting the possibility of production in suitable traps higher up.

In July two more projected Smackover wildcats were started on the northern rim of the basin. Grady Vaughn 1 Jackson was started just north of the Talco structure in northeastern Franklin County, and Bowlen & Vaughn 1 Simms was started in the Simms area of Bowie County. Both appear to be well to the south of the probable pinchout.

No Smackover Production in Texas

Operators are reluctant to forecast possibilities of the Smackover in Texas, since no production has been found as yet and only a handful of tests are known to have penetrated the section. But the combination of speculation on regional geology, plus local geological work, plus extensive geophysical work all superimposed on subsurface knowledge based on extensive random drilling for shallower pools gives a highly encouraging picture.

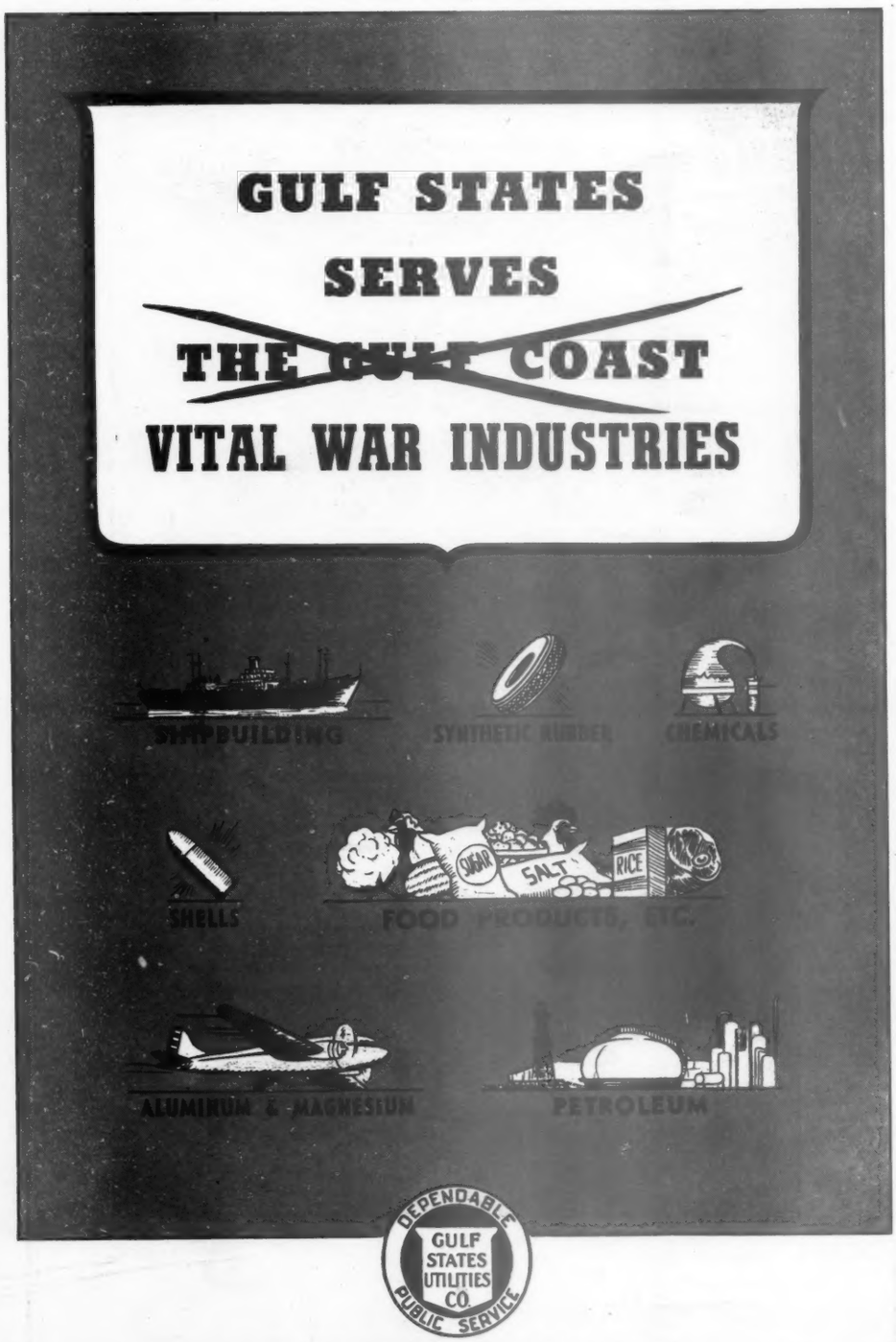
The extent of leasing, the size of the blocks and the long-time persistence of the play also support the general belief that operators hope to find major accumulations. Also, many geologists have in the back of their minds the possibilities of conglomerate production, assuming the presence of eroded granite surfaces beyond the present limits of the Smackover and Eagle Mills.

There are also possibilities in zones above the Smackover—the Marine group—and underlying the Smackover. However, practically no information is available on these deep zones. Little enough is known about the Smackover itself as paleontologists have had meager fossil and sample material to study.

The Eagle Mills, directly below the Smackover in Arkansas, has not always been recognizable in Texas. For example, the Texas Co. 1 Keeling (on which all information is unofficial) was reported to have found a lower Marine section below the Smackover which would ordinarily be the Eagle Mills but which carried no salt. The Eagle Mills in Arkansas definitely contains a salt section.

Gradually, however, the pieces of the puzzle are being put together. The four principal means of exploration—random drilling, surface geology, subsurface geology and geophysics—are being coordinated in a degree probably impossible in any other regional play. Experience of many years drilling and development is available for laboratory study and sufficient incentive for the search is at hand to warrant large investments in preliminary work.

This coordination of all the methods available to exploration has developed to the point that operators seeking a stratigraphic trap can hope to locate local deviations of the pinchout before drilling a well. Sufficient drilling has already been done, as pointed out above, to narrow the zone of probable limits of the Smackover to a few miles and to give geophysicists sufficient data to bring their analyses to a high degree of accuracy.



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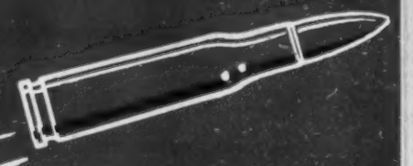

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SOUTHWEST TEXAS

Bee County Deep Test Shut Down Due to Excessive Pressures

By F. L. SINGLETON

CORPUS CHRISTI, Tex.—Magnolia 1 Buckner, a prospective Wilcox sand pool opener located in the Berclair area, Bee County, continues to be the main attraction in the Southwest Texas district. After cementing 5½-in. casing on bottom at 10,429 ft. last week, the well was cored ahead and reached a depth of 10,561 ft. where excessive pressures were encountered and the well is now shut down. Due to the high pressures which have been encountered below 10,100 ft., very little coring has been done and as a result little information is available as to where the top of the sand section was logged. This is one of the deepest tests drilled along the trend and is located downdip from established Wilcox production. A producer here would broaden the scope of this play several miles.

In the same county and located in the North Pettus field, Union Producing Co. 58 G. A. Ray was drilling below 5,000 ft. following a drill-stem test in the Pettus sand at 3,621-34 ft. which recovered 15 ft. of oil and 25 ft. of oily mud. This is a Wilcox test and will be drilled to a depth of approximately 7,500 ft.

In the Nordheim area, De Witt County, Tide Water 1 Gips, which has shown for production in several sands in the Wilcox at intervals from 7,000-8,300 ft., is shut down following a production test at 7,028-32 ft. where it flowed 94.5 bbl. of distillate and 61 per cent salt water on a 24-hour drill-stem test through a ¼-in. choke. Additional tests have been delayed by a leak in the casing which has been cemented off.

Gas-Distillate Field Indicated In Premont Area

In the Premont area, Jim Wells County, Shell Oil Co., Inc., was testing 1 A. L. Jones, and prospects of opening a new gas-distillate field were encouraging. Drilled to a total depth of 7,631 ft., 5½-in. casing was cemented at 7,317 ft. and on a production test at 6,062-67 ft. the well flowed 2,830,000 cu. ft. of gas and some distillate through a ¼-in. choke. Tubing pressure was 1,500 lb. and casing pressure 1,600 lb. At the end of the week the well had been killed and additional tests were to be made. Gas-distillate showings were also logged at 5,975-85 ft., 6,674-91 ft. and 6,983-7,088 ft.

In the same county, 2 miles west of Premont, Texas Gulf Producing 1-B Hewitt, McKinney & Williams, Survey 5, Section 44, was drilling below 6,600 ft. with no shows reported although the well is reported to be checking about 250 ft. higher than a dry hole 4,300 ft. due east. This correlation is based on top of the Vicksburg sand.

Additional development was scheduled to be started on the northwest side of the Nichols field, Hidalgo County, following completion of Royal Oil & Gas Co. 1-B Yturria Town & Improvement Co., completed through casing perforations at 3,666-73 ft. for an initial production of 100 bbl. daily through a ⅛-in. choke. North of the field about 5 miles, Baldridge & King have spudded 1 Daskam, in Tract 28, Porcion 45, a projected 6,500-ft. test.

In Wilson County, 7 miles northwest of the town of Floresville, L. D. Ormsby 1 H. J. Caldwell, J. W. Brown Survey, is shut down at a depth of 2,890 ft. following a 50-minute drill-stem test at 2,770-2,890 ft. which recovered 120 ft. of drilling mud with a faint oil odor and 420 ft. of brackish water.

H. K. Boysen 1 Hagist, 6½ miles northwest of the South Campana field, McMullen County, cored sand with an oil odor at 1,341-44 ft., and at 1,346-52 ft., and is drilling ahead after drill-stem testing failed due to mechanical trouble. The showing was logged in the Cole sand, topped at 1,341 ft. Location is in the H.&T.C. Survey 9.

A slight southwest extension was marked up for the South Campana field, McMullen County, with the completion of Texas 1 fee, which is flowing ungaged from casing perforations at 3,042-44 ft. The sand section was cored from 3,037-45 ft.

SOUTHWEST TEXAS COMPLETIONS

LOWER GULF COAST DISTRICT

Wildcats

Bee County: Rowe & McBride 1 Delaney, dry, T.D. 4,585 ft.

Shirley & Scheig 1 Morre, dry, T.D. 4,310 ft.

Fields

Koopman, Jim Wells County: Coastal Refineries 1 Koopman, dry, T.D. 6,000 ft.

Midway, San Patricio County: Seaboard 2 Ellis, 108 bbl., ⅛-in. choke, perf. casing 5,429-40 ft., T.D. 5,563 ft.

Seeligson, Jim Wells County: Magnolia 30 Seeligson, 230 bbl., 7/64-in. choke, perf. casing 5,908-12 ft., T.D. 6,001 ft.

Transwestern 16 Dunlap, 70 bbl., 5/64-in. choke, perf. casing 6,069-73 ft., T.D. 6,116 ft.

Stratton, Kleberg County: Humble 16 King, 116 bbl., ⅛-in. choke, T.D. 6,645 ft.

Wade City, Jim Wells County: W. R. Quinn 1 Priesmeyer, dry, T.D. 4,925 ft.

LAREDO DISTRICT

Wildcats

Webb County: Texas 1 Jones, dry, T.D. 1,784 ft.

Fields

Muralla, Duval County: Taylor 1-A Sepulvedo, dry, T.D. 5,585 ft.

North Rincon, Starr County: Sun 7 Garza, 159 bbl., 9/64-in. choke, perf. casing 4,530-33 ft., T.D. 4,586 ft.

Sejita, Duval County: Standard Oil Co. of Texas 1 Barrera, dry, T.D. 6,290 ft.

SOUTH CENTRAL TEXAS DISTRICT

Wildcats

Bexar County: J. Friedrich 1 Friedrich, dry, T.D. 952 ft.

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OKLAHOMA FIELD REPORT

Logan County Well Recovers Oil on Drill Stem Test

By CARL HOOT

WORK in Oklahoma over the past week was mostly routine although encouraging results from scattered wildcat tests were reported. In Logan County, Sunray Oil Co. 1 Welch, NW SE 7-16-2w, was attracting considerable attention when it showed some 300 ft. of oil and 400 ft. of oil-cut mud on drill-stem test in Simpson dolomite at 5,603-14 ft. A second drill-stem test was to be taken in the second Wilcox sand, found at 5,628 ft. Shows of oil were reported in soft sand at 5,649 ft. and 5,657 ft. The test is in the southwest corner of Guthrie townsite and is ½ mile east and slightly south of a dry hole drilled last year to 5,930 ft. In Seminole County, between the Seminole and Searight pools, Shell Oil Co., Inc., 1 Patterson, SW SE SE 12-9-6, continued testing and reported a flow of 26 bbl. of oil in 6½ hours with no water. On a previous test the well made 168 bbl. of oil and 450 bbl. of water in 9 hours. A second acid treatment will be given. In Carter County Pure Oil Co. 1 Fraser made a 24-hour flow of 1,884 bbl. of oil and 1,434 bbl. of water through 1-in. choke on 2-in. tubing. The well was then killed to make further perforations.

Plugged-Back Well Opens Distillate Zone

In the Doyle pool, northeast of Duncan in Stephens County, Helmerich & Payne 1-B Hefner, NE NW SW 12-1-5w, was plugged back from 5,912 ft. to 5,450 ft. and flowed 35,000,000 cu. ft. of gas with an estimated 31 bbl. of distillate per million cubic feet of gas. The gas was from sand at 5,357-5,410 ft. The Doyle pool is one of the state's oldest, having been discovered in 1922 when small production was found at a depth of around 1,000 ft. In 1939 Sunray deepened its 1 Hefner, ¼ mile east of the 1-B, from 3,816 ft. to 6,000 ft. and encountered considerable gas. It was plugged back to 5,745 ft. and flowed 12 bbl. of oil an hour.

Two oil wells were added to the south side of Alma Oil Co.'s new East Watchorn pool. Development has progressed steadily, the five producers making their allowable of 300 bbl. a day from Wilcox sand at an average depth of 3,900 ft.

New Cromwell Sand Pool In Okfuskee Production

In Okfuskee County Foundation Oil Co. 1 J. B. Baryman, SE NE 1-10-8, a wildcat 1½ miles southeast of the southern tip of East Cromwell, blew in after setting casing at 3,416 ft. in the top of Cromwell sand and sent a spray of oil over the crown block estimated at from 50 to 200 bbl. a day. Operators said that gas flow ranged from 10,000,000 to 40,000,000 cu. ft. a day. The well has been shut in for storage.

OKLAHOMA COMPLETIONS

Garvin County: Harry Culver et al 1 Hart, SE cor. 29-3-1, dry, T.D. 5,003 ft., Viola 3,549 ft., McLish 4,065 ft., Oil Creek 4,788 ft., Arbuckle 4,925 ft.

Hughes County: Cities Service 1 Maple, SE NW NE 23-9-11, dry, T.D. 2,244 ft.

Jefferson County: H. F. Gibson 1 Hefner, SW SE NE 30-3s-4w, dry, T.D. 2,993 ft., sand 2,120 ft., 2,450 ft., Arbuckle conglomerate 2,929 ft.

Kiowa County, 1 mi. S of Hobart pool: H. J. Sherman 2 Howard, SE NE 20-7-17w, dry, T.D. 1,615 ft., Viola 1,515 ft.

Pottawatomie County: Ohio 1 McQuiston, NW NE 23-9-3, dry, T.D. 5,574 ft., Earlsboro 4,573 ft., Woodford 4,908 ft., Hunton 4,996 ft., Viola 5,276 ft., Wilcox 5,419-55 ft., second Wilcox 5,556 ft.

Cushing, Payne County: Oklahoma Gasoline 1 Bickell, NW SW 2-18-6, pumped 4 bbl. oil and 4,500,000 cu. ft. gas, Skinner sand 2,872 ft., Burgess sand 3,225 ft., T.D. 3,276 ft.

North St. Louis, Pottawatomie County: Mid-Continent 1 Varner, SE NE 21-8-4, pumped 40 bbl., Hunton 4,025-40 ft.

Stillwater, West, Payne County: Portable Drlg. 1 Cory, NE NW SW 20-19-2, dry, T.D. 4,917 ft., Wilcox 4,815-55 ft.

Velma, Stephens County: Skelly 34 Selby, SE NE SW 26-1s-5w, pumped 12 bbl., sand 766-81 ft., T.D. 815 ft.

Watchorn, East, Pawnee County: Alma Oil 2 Deroin, SW SW NW 25-23-3, flowed 300 bbl. in 24 hr. through choke, Wilcox 3,896-3,916 ft.

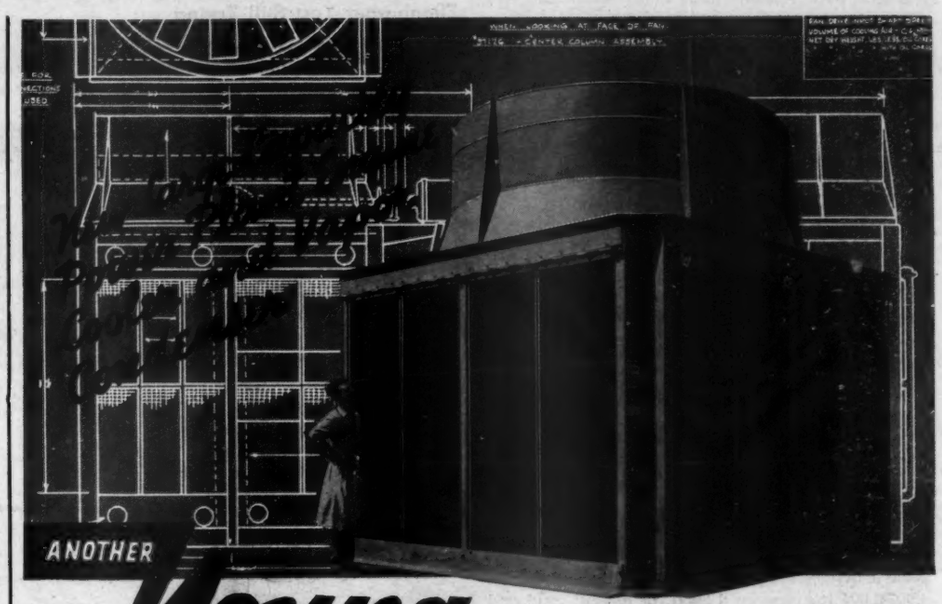
Alma Oil 1 Wentz, SW SE NE 26-23-3, flowed 900 bbl. in 12 hr., Wilcox 3,907-22 ft.

Miscellaneous

Okfuskee County: R. B. Patterson 1 Bell, N½ NE SW 13-12-11, dry, T.D. 986 ft., sand 843 ft.

Okmulgee County: R. H. Prince 1 Ferrell, SW NE SW 25-15-11, dry, T.D. 2,872 ft.

(Continued on Page 108)



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NORTH CENTRAL TEXAS

Montague County Has Second Simpson Oil Pool

By ROBERT INGRAM

WICHITA FALLS, Tex.—After drilling only a handful of tests in the heart of the Fort Worth basin in Montague County to establish the presence of a good Simpson section in the deeper areas, wildcatters last week brought in a second Simpson pool. It came in at Continental Oil Co. 1 Jack Hildreth, Block 53, E.T. Survey, 8 miles north of Bowie. First Simpson producer for the basin was at Continental 1 Mueller, 4 miles east of Bowie, brought in in May at 7,218 ft. for 717 bbl. daily.

Production at the Hildreth was establish by an 18-minute drill-stem test at 7,157-7,201 ft. which returned 100 ft. of free oil and 120 ft. of oil-cut mud, together with an estimated 50,000 cu. ft. of gas. An electrical survey was run and then preparations were made to test further. A cement bridge was set and 5-in. liner will be run from 7,033-7,157 ft. Base of 7-in. casing in the hole is 6,545 ft., and total depth is 7,201 ft. with top of the Simpson called at 7,070 ft.

Other wildcats in this sector of the basin, all playing for deep pays, were making progress except for Continental 1 Menefee & Hardy, Block 10, Limestone C.S.L. Survey, southeast of Stoneburg, which was stopped as a dry hole in the Viola at 6,697 ft., and Jerry Hawkins 1 Lowrie, a dry hole completion which had a show in the Simpson the week before.

Continental 1 Ketchum, Block 43, Hill Survey, took a drill-stem test on a sandy lime section at 4,997-5,004 ft., recovered 30 ft. of gas-cut mud and resumed drilling. To the south, just across the Wise County line, a second attempt to get a drill-stem test was under way at Stanolind 1 Menasco, Section 9, Falls C.S.L. Survey, northwest of Park Springs. The well drilled lime with a show at 5,598-5,600 ft. and cored to 5,608 ft. No core was recovered, but cuttings carried stain and odor. The Caddo had been topped at 5,575 ft., which figured about 30 ft. low to the Cranfill et al failure nearby.

Forestburg Gets Fourth Big Well

Still deeper into the Fort Worth basin due east of Bowie, Sinclair Prairie Oil Co. appeared to have a major pool developing at Forestburg—the only important deep pool in the county in the last 18 months. The Forestburg pool, while producing at a comparable depth with the Mueller, pays from much newer horizon than the Simpson. Its four big wells are in the Marble Falls, lower Bend series of the Pennsylvanian.

The newest of the wells, completed last week, was the Sinclair Prairie 2 I. M. Jones, which flowed 241 bbl. in 3 hours through 2-in. tubing. It had been treated with 6,000 gal. of acid after being drilled in with reverse circulation from 6,910 ft. to 7,072 ft., with total depth in lime at 7,218 ft. The well kicked off after being swabbed.

The Sinclair Prairie 3 Jones, drilled in the previous week, was given an official potential test.

Show in Young County

Promise of a Caddo lime pay area for Young County was seen at Standard of Texas and Hanlon-Buchanan 1 Daws, Section 751, T.E.&L. Survey, 11 miles west of Newcastle. The well topped the Caddo at 3,847 ft. and drilled lime showing oil from 3,847 ft. to 3,850 ft.; core from 3,850-55 ft. returned 2 ft. of lime showing oil, and core from 3,855 ft. to 3,860 ft., total depth, returned 3 ft. of lime showing oil. Seven-inch casing was set at 3,847 ft.

Ellenburger Test Still Trying

A plugback job was under way at Roy Lee 2 Watson, Farris Survey, Clay County, which is seeking Ellenburger pay north of the Antelope field. Shut in overnight after lime at 6,010-52 ft. was acidized, the well had water in the hole and operators planned to plug off the bottom and retest.

Joy Pool Outpost Delayed

North outpost to the Joy pool, a Caddo-Mississippi lime field of southern Clay County, Shell Oil Co. 1 Brock, Block 30, H. Williams Survey, made a well during the week, but the rig caught fire and delayed completion. The well had been shut in just before the blaze was discovered, and only damage was to surface installations. Earlier it had been drilled in with reverse circulation from 5,949 ft. to 6,021 ft. in the Mississippian and had flowed 185 bbl. in 1 hour through tubing after acid treatment.

NORTH TEXAS COMPLETIONS

Wildcats

Archer County: Sinclair Prairie 2 J. A. Hood, NW SE Sec. 18, A.T.N.C.L. Sur., 3½ mi. S of Holliday, dry, salt water at 5,100 ft., T.D. 5,100 ft.

White & Duncan 1 J. T. Richardson-A, 330 ft. from N and W lines of M. M. Laney Sur. A-1177, dry, T.D. 1,293 ft.

W. C. Young and Burk Royalty 1 J. T. Richardson, 2,896 ft. from E line and 359 ft. from S line E.L. R.R. Sur. A-687, dry, T.D. 1,274 ft.

Montague County: J. C. Hawkins et al Z. T. Lowry estate, SW NW Sec. 2824, T.E.&L. Sur., dry, Viola 6,790 ft., lime 6,809-6,903 ft., Ellenburger 7,289 ft., T.D. 7,384 ft.

Fields

Forestburg, Montague County: Sinclair Prairie 3 I. M. Jones, M. R. Box Sur. A-53, flowed 1,356 bbl. after acid, Marble Falls lime pay 7,121-7,248 ft., T.D. 7,428 ft.

Hoefle, Jack County: Hanlon-Buchanan 1 E. C. Porter, John S. Porter Sur. A-466, flowed 1,275 bbl. after acid, pay 4,843 ft., T.D. 4,866 ft.

K.M.A.-Ellenburger, Wichita County: Deep Oil Development 1-E J. A. Kemp estate, Lot 5, Blk. 1, K.W.V. F.L. Sur., flowed 116 bbl., pay 4,252 ft., T.D. 4,313 ft.

Ross, Clay County: Continental, Superior and Dillard 8 O. O. Ross, Jr., NW SE Sec. 31, William Walker Sur. A-703, flowed 806 bbl. after acid, pay 5,384 ft., T.D. 5,495 ft.

Thornberry, Clay County: Golden & Norwood 1 G. E. Myers, Blk. 49, Bacon subd., dry, T.D. 1,150 ft.

Miscellaneous

Archer County: Fain-McGaha 32 W. P. Ferguson, Sec. 2, S.P.R.R. Sur. A-968, T.D. 672 ft., input well.

Production Opened From New Sand in Anzac-Morris Field

FORT WORTH, Tex.—A new Canyon sand pay for the Anzac-Morris field of Coleman County was opened at Dale Smith 4-C Morris ranch, Dave Breeding Survey, northwest of Echo. The test picked up the sand at 2,037 ft., approximately 200 ft. higher than any of the other oil pays in the sector (gas was found in a comparable zone) and the oil from the sand is said to be of a different kind than any other crude produced in the area.

(Continued on Page 90)

EASTERN TEXAS

Test on Flank of Waskom Field Flowing Oil

By ROBERT INGRAM

DALLAS, Tex.—Oil production from the flank of the big Waskom gas-distillate structure in eastern Harrison County, indicated the previous week, was assured last week as the discovery well, First National Petroleum Trust 1 Armstrong, Simpson Holloway Survey, was flowing oil into tanks. Two 100-bbl. storage tanks were built on the site of the outpost, 1 mile from production, and one was reported filled and oil turned into the other.

At week's end an initial gage was taken. Through ¼-in. choke, the well made 40 bbl. of 38-gravity oil in 15 hours, and at the end of that period was making 2½ bbl. an hour. There was no report on pressures, but the gas volume was figured at 1,000,000 cu. ft. a day. Earlier pressure readings on a 13/64-in. choke were 750 lb. on casing and 500 lb. on tubing.

Operators continued to experiment on various chokes in an effort to establish a satisfactory productive and gas-oil ratio rate, and before a final gage is taken they will wash the hole with acid to clean out perforations.

Exact source of the oil is not known, since casing had been shot at several points between 5,904 ft. and 6,068 ft. in the Travis Peak. The well first gave oil pay promise when it flowed after a shut-in period. At that time, however, the fluid moved into the distillate after a flow period and it was believed the tubing had become loaded during the shut-in. Since later tests indicated a real oil flow, operators changed their plans to complete as a distillate well and began making efforts to complete it as a crude producer.

Thus will be made the first attempt at oil completion at Waskom from the lower pay zones, although the Arkansas Louisiana Gas Co. drilled a well on the southwest flank which showed oil but was officially completion as a wet gasser.

Dry Hole at Coke

First failure for the Coke (Black Oak) Paluxy sand pool of northern Wood County was foreseen at Magnolia Petroleum Co. 1 White, D. L. Townsend Survey, a south outpost to the pool. It topped the Goodland lime at 6,327 ft. and was coring below 6,353 ft. in lime, with only about 14 ft. left until the water table would be reached.

The well had been checked low on upper markers, proving an expected structural dip to the south. However, on top of the Georgetown, its position was regarded as still fairly favorable and thickening appears to have taken place in that section.

A failure here would be discouraging for Magnolia 1 I. E. Robinson, Townsend Survey, 2,500 ft. east of the 1 White. In other parts of the field, however, drilling proceded apace, with six other rigs running in addition to three more locations by Amerada Petroleum Corp. and Amerada 2 Faulk, Knight Survey, in the process of completion.

Cherokee Well to Shoot

Preparations were being made to perforate at Humble 1 Vaughn, Curtis Survey, deep discovery prospect northwest of Larissa in Cherokee County. Operators planned to shoot first at 10,160-200 ft. in the Pettit section where a drill-stem test indicated possible oil production.

Eastward, at Mixon, Magnolia 1 Braly, Thomas

(Continued on Page 98)

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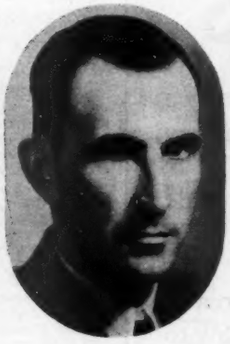

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KANSAS, NEBRASKA

Lansing Lime Pool Opened In Russell County

By CARL HOOT

EXPLORATORY work in Kansas has shown a steady increase throughout the summer, with a number of new pools opened and many producing areas extended. Fourteen wildcats were completed last week, of which 13 were dry.

Attention was focused on Russell County, where one test opened a new pool and another was showing for a pool extension. A. H. Witt 1-A fee, SW SW NE 3-14-14w, set 7-in. casing at 2,974 ft., perforated in Lansing lime at 3,000-9 ft. and pumped 429 bbl. of oil, initial potential. Location is approximately equal distance from the Hall-Gurney, Gorham and Russell pools and may open the intervening space for development.

Although these three pools have a number of producing zones, the Lansing-Kansas City lime is the main pay, with the exception of Russell, where production is mostly from the Arbuckle. The other Russell County wildcat test is a 1-mile outpost from the Russell pool. British American et al 1 Ehrlich, SW NW 15-13-14w, found water in Arbuckle dolomite but was plugged back and casing perforated in the Lansing-Kansas City lime around 3,000 ft. On swabbing tests the well still made considerable water but also had a good quantity of oil. On last report the operators were setting plug to shut off water before further tests could be made.

In Barber County a second well, offsetting the discovery, found the Lansing-Kansas City lime dry at 4,346 ft. The well is a ¼-mile west offset. The Sun City pool, discovered in December of last year, has two producing wells. The 1 Massey opened the pool with a state rating of 3,000 bbl. a day from Lansing at 4,351 ft.

The Peace Creek pools of Reno County have had renewed activity lately with five completions reported last week. The proven area in the Peace Creek proper field has broadened considerably, although edge wells have shown a decline in initial production. Sinclair Prairie 1 Crandall, NW SE 14-23-10w, flowed 41 bbl. in a 1-hour test from Viola at 3,760-68 ft. to extend the field over ¼ mile east.

NEBRASKA

ST. JOSEPH, Mo.—A period of quiet has settled on the Forest City basin, no new producers being reported in Nebraska during the week. Gulf Oil Co. is understood to have had a dry hole at 1 Snyder in SE NE NE 34-6n-15e, Nemaha County, Nebraska, 2 miles south of Peru. J. E. Palensky 1 N. A. Arnold in C SE SE 26-3n-16e, the northwest corner of the Barada pool, was causing operators much trouble with water from the pay zone. There was considerable oil in the Hunton, but cement jobs had failed to shut out water.

In Missouri, 1 mile north of the Polo shallow gas pool, Tiger Oil Co. started a Mississippi lime test. On last report the well was down 409 ft. and was setting casing. Saturation in sand was found at 261-67 ft. and also in sand and lime at 335-60 ft. Elevation is 1,017 ft.

KANSAS COMPLETIONS

Wildcats

Barber County, 4 mi. N of Lake City pool: H. M. Williams et al 1 Clay, SE SE 29-30-13w, dry, T.D. 4,881 ft., Lansing 3,990 ft, Mississippi lime 4,480 ft., Misener sand 4,595 ft., Viola 4,595½ ft., Arbuckle 4,804 ft.

Barton County, 3 mi. SE of Ainsworth: Champlin Ref. 1 Persons, NW NE NW 13-17-13w, dry, T.D. 3,413 ft., Lansing 3,140 ft., Arbuckle 3,393 ft., slight show oil 3,145 ft.

Lauck & Moncrief 1 Flicker, NE SE SW 14-17-12w, dry, T.D. 3,383 ft., Lansing 3,065 ft., conglomerate 3,328 ft., Arbuckle 3,341 ft.

Butler County, 1½ miles W of Keighley: Bartlett and Adair & Morton 1 Wilhite, SW NE NW 21-27-7, dry, T.D. 3,166 ft., Lansing 1,710 ft., Kansas City 2,030 ft., Bartlesville 2,636-53 ft., Mississippi lime 2,719-3,058 ft., Simpson dolomite 3,117 ft., Simpson sand 3,133 ft., Arbuckle 3,156 ft.

Greenwood County: Dunne 1-A Crawford, SE NW SE 8-28-12, dry, T.D. 1,017 ft., Kansas City 990 ft.

Jefferson County: Sifers et al 1 Leonhard, SE SW 9-10-19, dry, T.D. 1,709 ft., McLouth sand 1,610 ft., 5 bbl. a day at 2,410 ft., water 2,415 ft.

Marion County, 6 mi. S of Lost Springs: Rex & Morris 1 Silhan, NE SW NW 21-18-4, dry, T.D. 2,485 ft., Lansing 1,860 ft., Mississippi 2,403 ft., estimated 5 bbl. a day at 2,410 ft., water 2,415 ft.

Ness County: Aladdin Pet. 1 Dubbs, SE SE 3-16-24w, dry, T.D. 4,913 ft., Topeka 3,550 ft., Lansing 3,835 ft., Mississippi lime 4,470 ft., Viola 4,560 ft., Simpson 4,673 ft., Arbuckle 4,858 ft.

Norton County, 7 mi. W and N of Ray: Cities Service 1 Harrison, SW SW NE 18-5-21w, dry, T.D. 3,600 ft., Topeka 3,131 ft., Lansing 3,313 ft., Lamotte 3,385 ft., granite wash 3,589 ft., granite 3,597 ft.

Phillips County, 7 mi. NW of Dayton: Sinclair Prairie 1 Cummings, SW NW NW 2-3-20w, dry, T.D. 3,968 ft., Topeka 3,180 ft., Lansing 3,417 ft., Arbuckle, 3,744 ft., Lansing 3,942 ft., granite 3,965 ft.

Pratt County: Herndon Drlg. 1 Shearer, SW cor. 17-29-12w, dry, T.D. 4,733 ft., Lansing 3,875 ft., Mississippi lime 4,322 ft., Viola 4,486 ft., Simpson 4,605 ft., Arbuckle 4,698 ft.

Reno County, 1½ mi. W of Peace Creek: Republic 1 Wyss, SW NE SE 19-23-10w, dry, T.D. 3,816 ft., Lansing 3,284 ft., Viola 3,629 ft., Simpson 3,709 ft., Arbuckle 3,793 ft.

Lion Oil Ref. 1 Bughy, W½ SW NE 13-24-9w, dry, T.D. 4,277 ft., Lansing 3,279 ft., Mississippi lime 3,780 ft., Viola 4,090 ft., Simpson 4,150 ft., Arbuckle 4,202 ft., show oil 3,780-84 ft.

Russell County: A. H. Witt 1-A fee, SW SW NE 3-14-14w, pumped 143 bbl. in 8 hr., Lansing 3,000-9 ft., T.D. 3,011 ft., discovery.

Fields

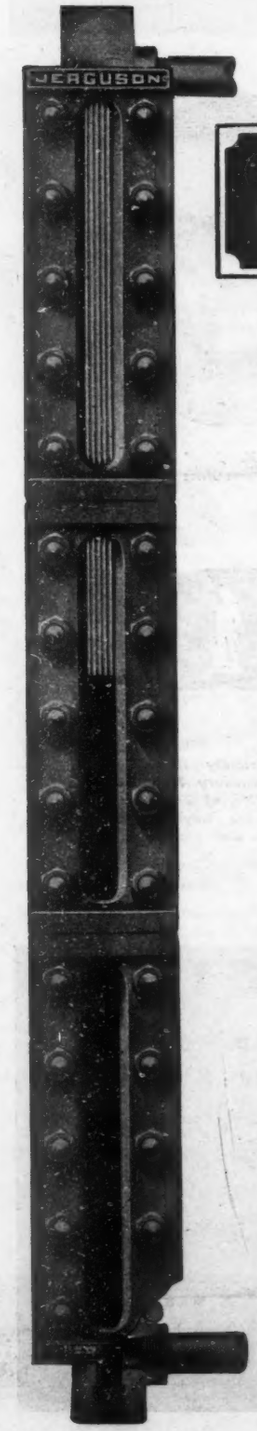
Beaumont, Greenwood County: K. T. Weideman 16-A Lewis. NE NE 35-27-8, pumped 15 bbl., Mississippi. lime 2,472-75 ft., Arbuckle 2,781-2,803 ft.

Eldorado, Butler County: Bennett et al 5-A Draper, SW NW SW 27-25-5, pumped 6 bbl., Viola 2,496-98 ft.

W. D. Dunn 1 Mabry, NE NE 13-26-4, pumped 30 bbl., Arbuckle 2,477-83 ft.

Eudora, Douglas County: Conrad & Holmes 1 Schehrer, NE NE NW 32-13-21, 200,000 cu. ft. gas, sand 709-12 ft.

(Continued on Page 95)



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INDIANA, OHIO, KENTUCKY

Deep Test to Be Drilled In Eastern Indiana

EVANSVILLE, Ind. — The Wayne County Producing Co. is moving in cable tools for a deep test in NW SW NE 22-13n-1w, about 7 miles northwest of Martinsville, Ind. The well is expected to start this week and is scheduled to be drilled to 4,200 ft.

Walter A. Martin 1 Elva Stallings, NW NW SE 25-5s-14w, Posey County, is drilling below 2,036 ft. and on upper markers is reported to be running approximately 30 ft. higher than other wells drilled in the area. No. 1 Stallings is 4 miles south of New Harmony and 8 miles north of the Mount Vernon pool.

Two miles north of the Stallings, Calstar Petroleum Co. is drilling below 1,440 ft. at the 1 Perry Schoultz, NE NE SW 12-5s-14w, Posey County, about 2 miles south of New Harmony. A show of oil was reported in the Pennsylvanian sand at 680-90 ft.

INDIANA COMPLETIONS

Daviess County: R. D. Brown, Inc., 1-C McCracken, S½ NW SE 16-2n-6w, 1,100,000 cu. ft. gas, Cypress 748 ft., pay 748½-57 ft., T.D. 757 ft.

Pike County: Joe Dawson 2 T. Roy, SE NE SW 16-3s-7w, location abandoned.

Joe Dawson 1 A. B. Scales, NE NE NE 8-3s-7w, location abandoned.

Posey County: Tide Water 17 Doll, NW SE SE 33-3s-14w, pumped 42 bbl. from Aux Vases and Cypress, 15-qt. shot in Cypress, T.D. 2,806 ft.

Carter & Gulf 1 E. Schneider, NW NW 12-7s-14w, swabbed 600 bbl., natural, Waltersburg sand 2,013-24 ft., T.D. 2,024 ft.

G. L. Parris 1 J. W. Spencer, SE SE 28-6s-14w, dry at 2,990 ft., base Pennsylvanian 1,640 ft., Menard 1,972 ft., Vienna 2,130 ft., Tar Springs sand 2,136 ft., Glen Dean 2,206 ft., Hardinsburg 2,262 ft., Golconda 2,355 ft., Cypress sand 2,510 ft., Paint Creek 2,600 ft., Renault 2,705 ft., Aux Vases 2,758 ft., Aux Vases sand 2,782 ft., Ste. Genevieve 2,797 ft., McClosky 2,798 ft.

Vanderburg County: T. W. Drake 1 J L. Graff, SW SE 4-7s-11w, location abandoned.

T. W. Drake 1 C. Kleinknect, SE SW 4-7s-11w, location abandoned.

Warrick County: H. & S. Drlg. 1 G. Johnson, SW SW 35-4s-6w, dry at 1,205 ft., base Pennsylvanian 570 ft., Menard 600 ft., Waltersburg sand 640 ft., Vienna 740 ft., Tar Springs sand 770 ft., Glen Dean 800 ft., Hardinsburg 840 ft., Golconda 890 ft., Barlow 1,000 ft., Paint Creek 1,050 ft., Benoist sand 1,060 ft., Renault 1,090 ft., Ste. Genevieve 1,133 ft., McClosky 1,195 ft.

White County: J. L. Cadrin 1 J. K. Wheeler, N½ NW NW 15-27n-6w. location abandoned

OHIO

ZANESVILLE, Ohio. — A 4,000,000-ft. well in westtern Lawrence County improved the prospects of the Clinton sand in the extreme south-central part of Ohio. No. 1 Vernon Iron Co. of the Ohio Fuel Gas Co., SW Section 30, Symmes Township, drilled through 7 ft. of pay to a depth of 3,200 ft.; the sand was logged 3,193-3,200 ft. The few wells that have been drilled in this area in the past have been small.

A wildcat test east of Mansfield in Richland County and west of the main Clinton sand gas field in Central Ohio found the Clinton sand missing. The S. D. McCloy 1 Jacob Sheetz, SE Section 36, Washington Township, had only a shelly formation in the Clinton horizon at 2,682 ft.; the lime was logged at 1,515-2,412 ft. The drilling was stopped in the Medina red at 2,720 ft.

OHIO COMPLETIONS

Athens County, Carthage Township: C. W. Nuzum 1 J. R. Fish, Sec. 35, 12 bbl., first Cow Run, T.D. 570 ft.

Canaan Township: Ohio Fuel 2 M. E. Mead, Sec. 5, dry, Keener, T.D. 972 ft.

Lodi Township: C. J. Ross 2-C. A. Colburn, Sec. 13, dry, first Cow Run, T.D. 527 ft.

Fairfield County, Pleasant Township: City Natural 1 C. Klump, Sec. 35, 120,000 cu. ft. gas, Clinton, T.D. 2,362 ft.

Hocking County, Ward Township: Preston Oil Co. 1846 Sunday Creek Coal Co., NW Sec. 17, dry, through Clinton sand, T.D. 3,468 ft.

Licking County, Mary Ann Township: C. C. Moore 1 D. Lane, Sec. 4, dry, Clinton 2,745-85 ft., T.D. 2,805 ft.

Medina County, Hinckley Township: Ohio Fuel 1 L. E. West, Lot 47, 800,000 cu. ft. gas, shot, Clinton, T.D. 3,273 ft.

Belmont Quadrangle Drilling Corp. 1 John Johnson, SW Sec., Lot 54, dry, showing of 12,000 cu. ft. gas only, Clinton sand, T.D. 3,269 ft.

Meigs County, Orange Township: H. B. Walker & Co. 2 A. A. Person, Sec. 36, 500,000 cu. ft. gas, first Berea, T.D. 1,616 ft.

Rutland Township: Ohio Fuel 1 Kail Knapp, Sec. 32, 400,000 cu. ft. gas, Salt sand, T.D. 616 ft.

Monroe County, Franklin Township: Hines & Gardner 2 P. Gardner, Sec. 1, dry, Berea, T.D. 1,804 ft. (old well deepened from Squaw sand).

Morgan County, Marion Township: Wade Henry 13 T. Hoopes, Lot 5, 2 bbl., shot, first Cow Run, T.D. 420 ft.

Williams Bros. 1 A. Woodyard, Sec. 33, show gas, second Berea, plugged, T.D. 1,555 ft.

Muskingum County, Newton Township: Atha Oil Account 1 W. O. Lake, SE Sec. 7, 600,000 cu. ft. gas, Clinton sand 3,391 ft., T.D. 3,406 ft.

Noble County, Center Township: R. Spriggs 1 J. Foreman, Sec. 35, dry, M-300 ft. sand, T.D. 304 ft.

Jackson Township: Worral & White 1 E. W. Way, Sec. 14, dry, M-700 ft. sand, T.D. 1,251 ft.

Seneca Township: J. T. Watson 1 J. Groves, Sec. 27, 870,000 cu. ft. gas, Salt sand, T.D. 913 ft.

Perry County, Bearfield Township: J. B. Orndoff 1 William Schwereszec, NE Sec. 16, dry through Berea, T.D. 1,093 ft.

Clayton Township: Preston Oil Co. 2 J. W. Ford, SE Sec. 6, 16 bbl. and 25,000 cu. ft. gas, Clinton sand, T.D. 3,308 ft.

Preston Oil 1 J. W. Ford, Sec. 5, 18 bbl., shot Clinton 3,101-48 ft., T.D. 3,155 ft.

Coal Township: Preston Oil Co. 1837 Sunday Creek Coal Co., SE Sec. 36, hole filled up 500 ft. with fluid before shot and estimated will make 20-bbl. pumper, Clinton sand, T.D. 3,742 ft.

Reading Township: Pure Oil 3 J. A. Pargeon, Sec. 12, 44 bbl., shot Clinton, T.D. 3,217 ft.

Pure Oil 1 E. Brown, Sec. 1, 108 bbl., shot, Clinton, T.D. 3,234 ft.

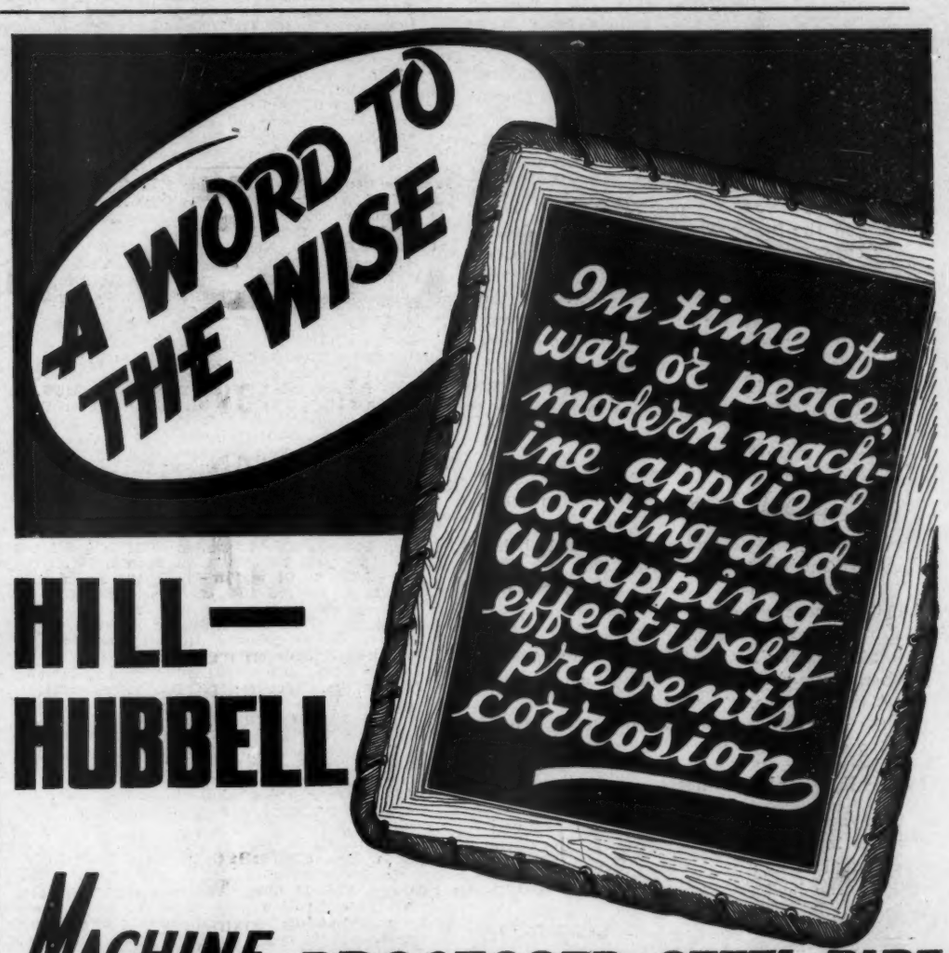
Richland County, Monroe Township: Ohio Fuel 1 Willard Culler, Sec. 2, 150,000 cu. ft. gas, Clinton, T.D. 2,391 ft.

Summit County, Bath Township: Wiser Oil Co. 1 E. A. Bidell, Lot 14, 230,000 cu. ft. gas, shot, Clinton, T.D. 3,697 ft.

Tuscarawas County, Fairfield Township: J. A. Upham 1 G. B. Stiffler, Sec. 13, 260,000 cu. ft. gas, shot, Clinton, 4,922-72 ft. and 4,987-5,033 ft., T.D. 5,042 ft.

Vinton County, Harrison Township: Kelch Bros. 1

(Continued on Page 99)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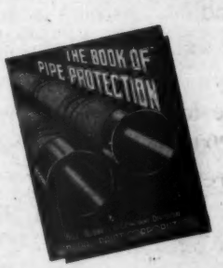

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Second Trenton Field Found In Southwestern Illinois

MATTOON, Ill. — The continuous growth of Trenton lime exploration in southwestern Illinois which followed the discovery of the St. Jacob pool in Madison County last week resulted in the discovery of a second Trenton field in that part of the state. P. S. Pritchard and Big Chief Drilling Co. 1 Holliday, SE NE NW 31-2n-7w, southeast of Bellville in St. Clair County, found the Trenton zone at 1,919 ft. and cores showed oil saturation from 2,341-68 ft. An electrical survey indicated that 54 ft. of the lime zone was productive. Casing is being run for a test.

Other tops recorded by the log were the St. Louis lime at 620 ft. and the Devonian lime at 1,477 ft.

Meanwhile, two new operations have been started in the St. Jacob area which will doubtlessly exert considerable influence on future development. The Kingwood Oil Co. 1 L. Hirsch, SW SE SW 9-3n-6w, about ½ mile west of the town of St. Jacob and more than ¾ mile from production in the St. Jacob pool, at last reports was drilling below 1,068 ft. Another outpost well, I. G. Watkins 1 Zigler, has been located in SW NW SE 3-3n-6w, about 3 miles northeast of production.

A southeast outpost well, E. A. Obering and M. D. Bryant 1 Buchman, SW NW SE 27-3n-6w, is on swab test at the present time making about 60 per cent water and 40 per cent oil with no gage known on the amount of fluid being swabbed. The Burdette and Hull 1 O. A. Frey, SW SW SW 22-3n-6w, midway between the 1 Buchman and other producing wells in the pool, is also testing. Operators started testing a second time after having left the well idle for 72 hours. Upon returning to the well, they found 1,000 ft. of fluid in the hole, of which 25 per cent was oil and the remainder water. The operators are considering shooting the well before further testing.

Mount Erie Pool Extended

A Wayne County well that was abandoned as a dry hole in 1931 was developed into a producer when tested in the Aux Vases sand last week. The well was the Jablonski-Duncan 1 Cox, SE SW 35-1n-8e, ¼ mile north of the Mount Erie pool. It was known as the 1 Garrison when abandoned in the McClosky lime in 1939. However, the well was shot with 40 qt. of nitro in the Aux Vases at 2,982-95 ft. a short time ago and has been completed for an initial production of 180 bbl. The Mount Erie pool at present produces only from the McClosky lime but the showing at 1 Cox may stimulate Aux Vases development in the pool.

Drilling Restrictions Modified in Illinois

Increased activity in new development is expected in Illinois following the announcement in Washington last week that an agreement had been reached on the liberalization of the M-68 restrictions on well spacing in Illinois, Indiana, and Kentucky.

According to a statement made by Sen. Scott Lucas and Rep. L. F. Arnold, the agreement permits operators to drill one well to 10 acres in sand formations to 2,500 ft., 20-acre spacing below 2,500 ft. in sand and 40-acre spacing in limestone horizons. Applications for exceptions will not be necessary and priorities on equipment on hand in the area will not be required under the agreement.

ILLINOIS COMPLETIONS

Wildcats

Clay County: Mid-Sun Oil 1 Frey, NE NW 8-4n-6e, dry at 2,848 ft., Glen Dean 2,210 ft., Hardinsburg 2,246 ft., Golconda 2,308 ft., Barlow 2,388 ft., Cypress 2,440 ft., Paint Creek 2,576 ft., Benoist 2,600 ft., Renault 2,640 ft., Ste. Genevieve 2,715 ft., Fredonia 2,756 ft.

Coles County: E. C. Baker et al 1 Moore, S½ SE NE 24-14n-7e, pumped 10 bbl., 10-qt. shot 1,806-14 ft., 40-qt. shot 1,804-14 ft., Aux Vases 1,806-12 ft., T.D. 1,872 ft., P.B. 1,823 ft., *Cook's Mills extension.*

Edwards County: Central P. L. 1 D. C. Staninger, NE NW NE 31-1n-14w, dry at 3,204 ft., Weiler 2,812 ft., Bethel 3,000 ft., Aux Vases 3,116 ft., McClosky 3,164 ft.

Franklin County: W. C. McBride 1 C. Mower, SE SE SW 14-5s-1e, dry at 2,940 ft., Glen Dean 2,201 ft., Golconda 2,306 ft., Cypress 2,423 ft., Aux Vases 2,705 ft., Ste. Genevieve 2,756 ft.

Cattlett 2 Coal Co., NE NW SW 2-7s-4e, dry at 3,288 ft., Kincaid 1,881 ft., Menard 2,224 ft., Vienna 2,359 ft., Tar Springs 2,377 ft., Glen Dean 2,478 ft., Hardinsburg 2,525 ft., Golconda 2,615 ft., Barlow 2,737 ft., Cypress 2,834 ft., Paint Creek 2,924 ft., Benoist 2,992 ft., Renault 3,044 ft., Aux Vases 3,066 ft., Rosiclare 3,162 ft., Fredonia 3,222 ft.

Gallatin County: R. B. Martin 1 Minor, SE NE NE 28-8s-9e, dry at 2,978 ft., Kincaid 1,659 ft., Palestine 1,904 ft., Menard 1,955 ft., Waltersburg 2,056 ft., Vienna 2,113 ft., Tar Springs 2,164 ft., Glen Dean 2,254 ft., Hardinsburg 2,279 ft., Golconda 2,329 ft., Paint Creek 2,568 ft., Renault 2,714 ft., Aux Vases 2,801 ft., McClosky 2,898 ft.

Sohio 1 Crawford-Wright, NE SW SW 12-8s-10e, dry at 2,751 ft., Kincaid 1,759 ft., Palestine 2,066 ft., Menard 2,102 ft., Tar Springs 2,282 ft., Glen Dean 2,314 ft., Hardinsburg 2,373 ft., Golconda 2,427 ft., Barlow 2,545 ft., Cypress 2,582 ft.

Jefferson County: Ohio 1 Southern Ill., N½ SE NE 34-2s-4e, dry at 3,206 ft., Glen Dean 2,415 ft., Cypress 2,632 ft., Renault 2,895 ft., Aux Vases 2,925 ft., Ste. Genevieve 2,980 ft., Rosiclare 3,010 ft., Fredonia 3,055 ft., St. Louis 3,195 ft.

Marion County: Arrow Drlg. 1 Stonecipher, SW NE SE 32-2n-4e, dry at 2,850 ft., Menard 1,992 ft., Glen Dean 2,231 ft., Golconda 2,302 ft., Barlow 2,401 ft., Cypress 2,445 ft., Benoist 2,592 ft., Aux Vases sand 2,685 ft., Ste. Genevieve 2,722 ft., Fredonia 2,733 ft.

Richland County: George H. Gimple 1 Rose Goodwin, W½ SE NW 28-5n-14w, dry at 190 ft.

Ohio 1 G. & R. Nelson, NW NW SE 20-3n-10e, dry at 3,299 ft., Menard 2,275 ft., Waltersburg sand 2,434 ft., Tar Springs 2,447 ft., Glen Dean 2,541 ft., Hardinsburg 2,567 ft., Barlow 2,731 ft., Weiler 2,815 ft., Paint Creek 2,864 ft., Benoist 2,944 ft., Renault 2,996 ft., Ste. Genevieve 3,077 ft., Fredonia 3,110 ft.

St. Clair County: L. L. Benoist 1 Tiedman, SE SW NW 8-2n-7w, dry at 300 ft.

Saline County: Fortner et al 1 Tison, NE NE 27-7s-6e, dry, Kincaid 1,908 ft., Palestine 2,075 ft., Menard 2,142 ft., Glen Dean 2,374 ft., Hardinsburg 2,480 ft., Golconda 2,548 ft., Cypress 2,732 ft., Paint Creek 2,820 ft., Bethel 2,853 ft., Renault 2,926 ft., Aux Vases 3,023 ft., Ste. Genevieve 3,051 ft.

Shelby County: Ollie Braugher 1 Homer Lautz, SE SE SE 36-13n-2e, dry at 1,035 ft.

Wayne County: Pure 1 W. A. Brown, NE SE NE 28-1n-7e, pumped 58 bbl. oil and 109 bbl. water, 24-qt. shot 3,174-80 ft., McClosky 3,159-63 ft., T.D. 3,200 ft., *pool opener.*

White County: Burr Lambert 1 Meade, NE SE SE 23-5s-9e, dry at 3,155 ft., Kincaid 1,962 ft., Menard 2,301 ft., Tar Springs sand 2,441 ft., Glen Dean 2,550 ft., Golconda 2,654 ft., Barlow 2,770 ft., Cypress sand 2,823 ft., Paint Creek 2,895 ft., Renault 2,995 ft.

Williamson County: Tioga Oil Co. 1 Biehl Comm., NW NW NW 8-8s-3e, dry at 2,952 ft., Glen Dean 2,185 ft., Golconda 2,272 ft., Barlow 2,413 ft., Cypress 2,487 ft., Paint Creek 2,585 ft., Renault 2,725 ft., Aux Vases 2,760 ft., Ste. Genevieve 2,785 ft., Rosiclare 2,848 ft., Fredonia 2,921 ft.

Smokey Oil et al 1 Isaacs, SE SE NW 36-8s-3e, dry at 2,898 ft., Degonia 1,607 ft., Clore 1,636 ft., Palestine 1,668 ft., Menard 1,806 ft., Waltersburg 1,925 ft., Glen Dean 2,056 ft., Hardinsburg 2,174 ft., Golconda 2,204 ft., Barlow 2,342 ft., Cypress 2,387 ft., Paint Creek sand 2,487 ft., Benoist 2,502 ft., Aux Vases 2,650 ft., Ste. Genevieve 2,698 ft., Rosiclare 2,714 ft., Fredonia 2,734 ft., McClosky 2,755 ft.

Fields

Beaver Creek, Bond County: W. C. McBride 1 Follett, SE NW NW 31-4n-2w, pumped 11 bbl. oil and 22 bbl. water, natural, Benoist sand 1,121 ft., T.D. 1,124 ft.

Boulder, Clinton County: Texas 3 Gray, SW NE SW 35-3n-2w, pumped 160 bbl. oil and 8 bbl. water, 5-qt. shot 1,211-16 ft., Benoist 1,199 ft., T.D. 1,220 ft., P.B. 1,218 ft.

Bridgeport, Lawrence County: Alford Pet. Co. 6 Gutteridge, NW SE NW 29-3n-12w, pumped 87 bbl., 35-qt. shot 1,936-50 ft., 120-qt. shot 1,936-53 ft., Benoist 1,932-50 ft., T.D. 1,953 ft.

Clay City, Clay County: Pure 1 Graham, S½ SW SW 34-3n-8e, pumped 29 bbl. oil and 29 bbl. water, 20-qt. shot 2,587-93 ft., Weiler 2,584-93 ft., T.D. 2,593 ft.

Covington, Wayne County: Sohio 4 Harris, NE NE 25-1s-6e, pumped 5 bbl., 1,000 gal. acid, reacidized 2,500 gal., McClosky 3,248-52 ft., T.D. 3,258 ft.

Sun 1 F. Mauck, NW SW 20-1s-7e, pumped 72 bbl. oil and 50 bbl. water, perf. 3,207-16 ft., 4,000 gal. acid, McClosky 3,253-58 ft., T.D. 3,258 ft.

Deep Rock 1-B Blackburn, SW SW 20-1s-7e, pumped 220 bbl. oil and 27 bbl. water, 5,000 gal. acid, McClosky 3,253-62 ft., Levias 3,209-14 ft., T.D. 3,265 ft.

Kewanee 1 Beck-Samford, NW NW 29-1s-7e, pumped 114 bbl. oil and 5 bbl. water, 4,500 gal. acid, old well P.B. from 3,225-3,215 ft.

Dale, Hamilton County: Texas 1 M. F. Hatton, NW SW NW 13-6s-6e, dry at 3,129 ft., Menard 2,254 ft., Glen Dean 2,514 ft., Cypress 2,775 ft., Paint Creek 2,990 ft., Renault 3,090 ft., Aux Vases sand 3,115 ft.

Dundas, Jasper County: Pure 3 Mills, E½ SE NW 18-5n-10e, flowed 461 bbl., 5,000 gal. acid, McClosky 2,854-57 ft., 2,882-85 ft., T.D. 2,897 ft.

East Centerville, White County: Ameriagene, Inc. 1 Rudolph unit, SW NE 18-4s-10e, pumped 78 bbl., 50-qt. shot 2,488-2,518 ft., Tar Springs 2,467 ft., T.D. 2,538 ft.

Geff, Wayne County: Pure 1 Tubbs, SW SW 12-1s-7e, pumped 339 bbl., natural, Aux Vases sand 3,053 ft., pay 3,059-74 ft., T.D. 3,094 ft.

Pure 1-A Blackburn, NE NW 13-1s-7e, pumped 95 bbl., natural, Aux Vases 3,063-77 ft., T.D. 3,090 ft.

Griffin, Wabash County: Longhorn 34 Heim, NE SW SW 22-3s-14w, pumped 150 bbl., 60-qt. shot 2,760-77 ft., Aux Vases sand 2,756-77 ft., T.D. 2,881 ft.

Johnsonville, Wayne County: Wiser 1-A Dickey, N½ NE SW 34-1n-6e, pumped 100 bbl. from Aux Vases and McClosky, natural, old well P.B. from 3,124-2,989 ft.

Keensburg, Wabash County: Continental 6-A Schultz, NE NE SE 8-2s-13w, pumped 12 bbl. oil and 10 bbl. water, Benoist 2,535 ft., old well deepened from 2,480-2,577 ft.

Lancaster, Wabash County: Hayes Drlg. et al 1 Neikirk heirs, S½ NW NW 9-1n-13w, pumped 40 bbl. oil and 200 bbl. water, natural, McClosky 2,717-21 ft., 2,723-35 ft., 2,746-51 ft., T.D. 2,775 ft.

Mayberry, Wayne County: Texas 1 R. Smith, N½ NE SW 7-3s-6e, dry at 3,434 ft., Glen Dean 2,642 ft., Barlow 2,874 ft., Aux Vases 3,192 ft., Ste. Genevieve 3,246 ft., Levias 3,264 ft., Rosiclare 3,290 ft., Fredonia 3,333 ft., McClosky 3,340 ft., St. Louis 3,421 ft.

Texas 1 Buchanan-Butler, N½ SW NW 8-3s-6e, dry at 3,395 ft., Glen Dean 2,697 ft., Barlow 2,932 ft., Ste. Genevieve 3,295 ft., Levias 3,306 ft., Rosiclare 3,320 ft., Fredonia 3,360 ft., McClosky 3,364 ft.

Mill Shoals, White County: S. C. Yingling 4 Poorman, SE SW SE 19-3s-8e, pumped 70 bbl. natural, McClosky 3,285 ft., T.D. 3,352 ft.

Mt. Erie, Wayne County: Jablonski-Duncan 1 Cox, SE SW 35-1n-8e, pumped 180 bbl., 40-qt. shot 2,982-95 ft., Aux Vases 2,976-95 ft., T.D. 2,996 ft.

New Bellair, Crawford County: W. H. Krohn 1 Wyman, S½ NE SE 19-8n-13w, dry at 1,185 ft., sand 1,159 ft.

Noble, Richland County: Pure 1 C. Englebow, SW NW 23-4n-9e, dry at 3,015 ft., Glen Dean 2,401 ft., Barlow 2,554 ft., Cypress sand 2,605 ft., Aux Vases sand 2,853 ft., Ste. Genevieve 2,918 ft., Rosiclare 2,928 ft., Fredonia 2,943 ft., McClosky 3,000 ft.

Pure 1 Lucas Consol., NW NE 25-4n-9e, pumped 17 bbl., natural, Cypress pay 2,540-48 ft., T.D. 2,580 ft.

Olney, Richland County: Texas 1 Boatman Consol., NW NW SE 27-4n-10e, flowed 376 bbl., 2,000 gal. acid, Ste. Genevieve 3,032 ft., pay 3,060-74 ft., T.D. 3,185 ft.

Plainview, Macoupin County: R. G. Whipple 3 Rhoades, NE SW SW 35-9n-8w, dry at 390 ft., sand 377 ft.

Posey, Clinton County: H. A. Schiermann 1 H. A. Hempen, NE SE NE 17-1n-2w, dry at 1,144 ft., Glen Dean 930 ft., Golconda 980 ft., Cypress 1,096 ft.

Roland, White County: Mabee O. & G. 1 G. W. Leathers, SE NE 2-7s-8e, flowed 140 bbl., 40-qt. shot 2,852-75 ft., 30-qt. shot 2,785-2,801 ft., Benoist 2,789-2,804 ft., Benoist sand 2,818-75 ft., T.D. 2,875 ft., P.B. 2,804 ft.

Carter 1 Edwards, NE SW NW SE 16-7s-8e, pumped 2 bbl. oil and 10 bbl. water, 60-qt. shot 3,000-24 ft., Aux Vases 2,992 ft., T.D. 3,024 ft.

Rural Hill, Hamilton County: Ohio 3 Moore, NE NE SW 35-6s-5e, flowed 224 bbl., natural, Aux Vases sand 3,238 ft., pay 3,246-54 ft., T.D. 3,260 ft.

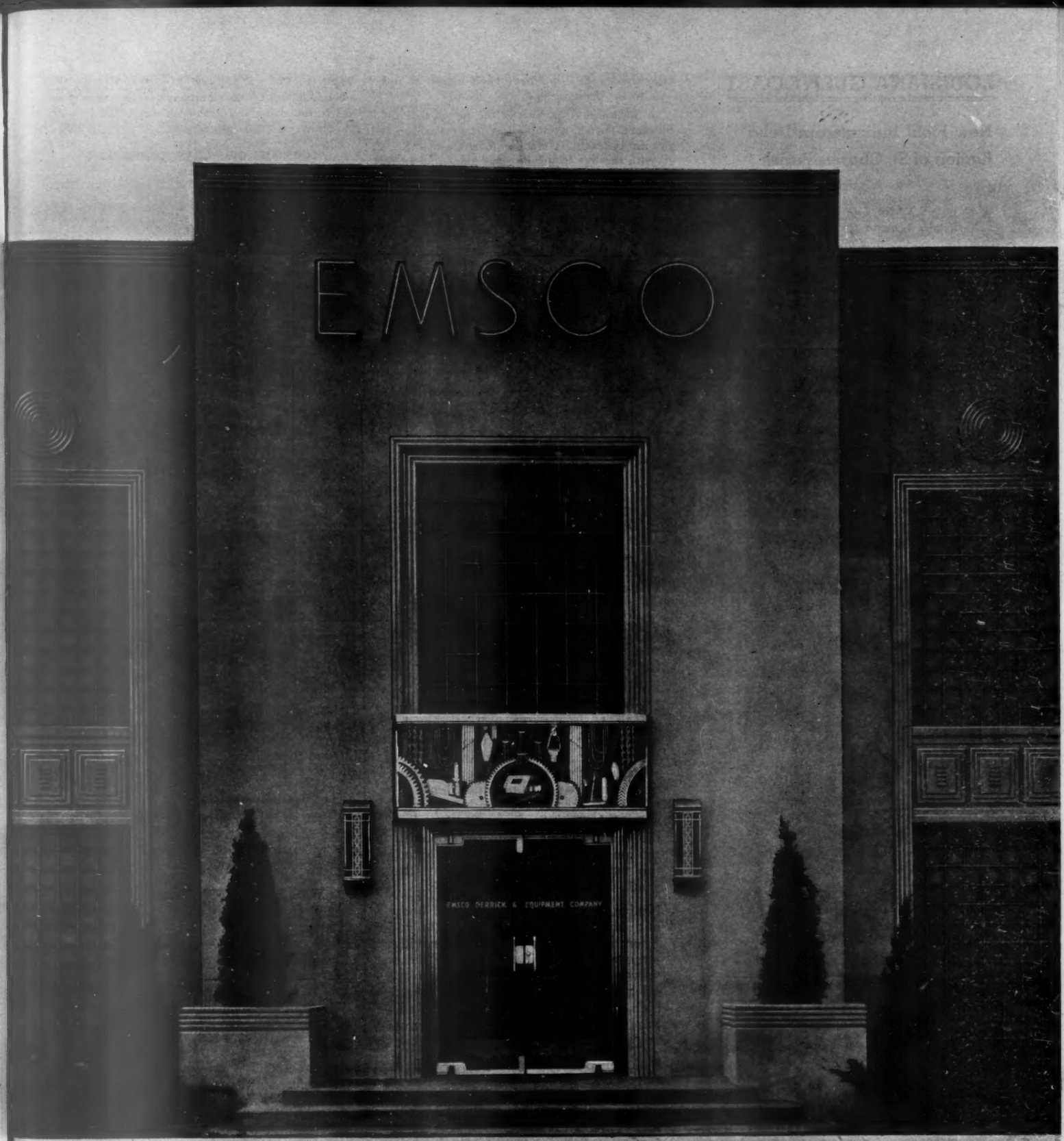
St. Jacob, Madison County: M. D. Bryant et al 1 Becker, SW NW SE 16-3n-6w, pumped 612 bbl., 5,000 gal. acid, Trenton, old well deepened from 2,384-2,404 ft.

Ste. Marie, Jasper County: C. R. Craft 1 J. Reis, E½ SW NE 6-5n-14w, pumped 76 bbl., 5,000 gal. acid, McClosky 2,848-56 ft., 2,862-65 ft., T.D. 2,866 ft.

Salem, Marion County: Texas 18 Williams, SE NE SE 31-2n-2e, pumped 191 bbl., Trenton 4,456 ft., pay 3,785-3,807 ft., old well deepened from 3,340-4,580 ft.

Sims, Wayne County: M. B. Armour 2 Green, W½ SE NW 22-1s-6e, dry at 3,226 ft., Glen Dean 2,599 ft., Golconda 2,684 ft., Barlow 2,786 ft., Paint Creek 2,978 ft., Renault 3,065 ft., Aux Vases 3,076 ft.,

(Continued on Page 98)



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LOUISIANA GULF COAST

New Field Indicated in Delta Region of St. Charles Parish

By F. L. SINGLETON

NEW ORLEANS, La.—With the coring of additional oil sands, there was little doubt that Gulf Refiing Co. had opened a new oil field in the Delta district of coastal Louisiana, 14 miles southwest of New Orleans in St. Charles Parish. The possible discovery is 1 Delta Securities Co., in 13-15s-21e, which is coring ahead in sand below 6,010 ft. with showings of oil logged at intervals from 5,708-29 ft. The hole is being cored solid with the first showings reported around 2,280 ft. Broken sand and sandy shale showing favorable possibilities have been logged at intervals to the present depth.

In the southern portion of the Bayou Sale field, St. Mary Parish, Atlantic 6 St. Mary Parish Land Co., in 17-16s-9e, is drilling in shale below 9,921 ft. with the top of Marine sand topped at 9,820 ft. From 9,820-9,900 ft., 8 ft. of sand with an oil odor was recovered which apparently is a new sand for the structure.

Gulf 1 Amoskeag Saving Bank, located in the Hayes field, Calcasieu Parish, is reported to have drilled sand at 9,780-83 ft., and the well began to kick and showed considerable gas. At the end of the week the weight of the mud was being increased and the well is scheduled to be drilled ahead. The top of the Heterostegina formation was tentatively established at 9,780 ft.

The new deep sand recently established in the West Gueydan field, Vermilion Parish, by the Pure Oil Co. was defined to the west with the abandonment of the company's 1 Calcasieu Parish National Bank. Total depth was 10,901 ft. with no shows of oil or gas reported.

LOUISIANA GULF COAST COMPLETIONS

Wildcats

Evangeline Parish: Continental 2 Pardee, dry, T.D. 12,688 ft.

St. Tammany Parish: J. E. Stanga 1 Goodbee, dry, T.D. 1,612 ft.

Fields

Delta Farms, La Fourche Parish: California 8 Delta Farms, Inc., 229 bbl., ⅛-in. choke, perf. casing 9,010-52 ft., T.D. 9,620 ft.

Pine Prairie, Evangeline Parish: Humble 1 Ortego, 222 bbl. 5/32-in. choke, perf. casing 7,998-8,003 ft., T.D. 8,064 ft.

Raceland, La Fourche Parish: Amerada 4 J. P. Moore, 276 bbl., 9/64-in. choke, perf. casing 8,930-55 ft., T.D. 10,225 ft.

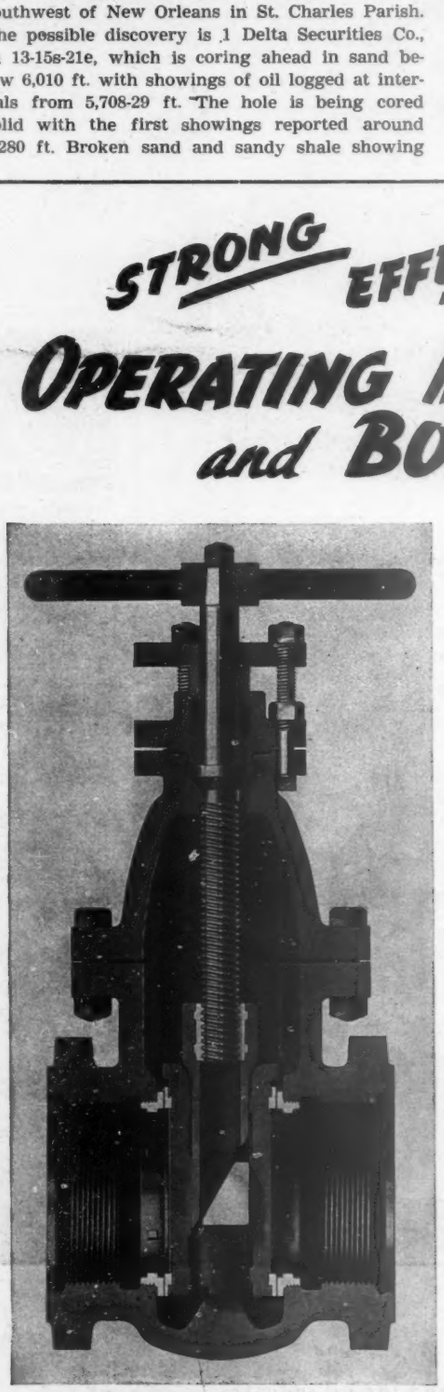
Valentine, La Fourche Parish: Pan American 23 Harang, dry, T.D. 9,336 ft.

Venice, Plaquemines Parish: Tide Water 18 Buras Levee district, top salt 5,268 ft., dry, T.D. 5,276 ft.

West Gueydan, Vermilion Parish: Pure 1 Calcasieu Parish National Bank, dry, T.D. 10,901 ft.

STRONG EFFECTIVE DURABLE

OPERATING MECHANISMS and BODIES



Let your eye follow the operating mechanism of this Kennedy Non-Rising Stem Screwed Gate Valve for oil and gas industry service.

First, notice the large handwheel for ample leverage. Then look at the heavy stem and the sturdy proportions of the two parallel discs. The valve is shown in the closed position, and final closure is obtained horizontally by means of wedges which spread the two discs apart and against the seats. Then, at the first opening motion, the wedging action is released, the two discs move away from the seats, and the valve opens easily.

Notice, too, the thick sections of body and bonnet, and the many little refinements of design that provide strength and lasting security. These valves are widely used in refineries, oil and gas fields, pump houses, and high-pressure oil or water pipe lines because a first trial invariably wins large repeat orders.

You can obtain Kennedy Valves in a full range of sizes and pressures, with screwed or flanged ends and with non-rising stem or outside-screw-and-yoke. For full description, send for the 240-page Kennedy Catalog.

THE KENNEDY VALVE MFG. COMPANY
ELMIRA, N. Y.

KENNEDY
Extra Value in VALVES

West Central Texas

(Continued from Page 84)

The well was estimated good for 5 to 10 bbl. a day, natural, but the sand will be shot before completion. Although there are three regular pays below this sand—the Cross Cut, the Morris, and the Fry—the well will be completed without deepening, it was understood.

Ellenburger Shows in Stephens

Ellenburger production was showing at Fleming Oil Corp. 4 Corbett, Section 2, Block 3, S.P. Survey, 12 miles north of the town of Caddo in Stephens County. If successful, the well will open the first Ellenburger pay in the eastern half of the county.

It topped the Ellenburger at 4,467 ft. and drilled lime showing oil from 4,545 ft. to 4,555 ft. Five-and-one-half-inch casing was cemented at 3,994 ft. and the hole filled 550 ft. with oil in 36 hours, natural.

Operator was swabbing to test, with the well estimated good for 50 to 100 bbl. daily. This is the sixth well to be drilled by the company on the Quincey Corbett ranch, but other wells in the pool produce from the Marble Falls, of the lower Pennsylvanian. Confirmation of the deeper pay will offer possibilities for a deepening program at some later date.

Gas Well Found 1 Mile From Oil Pool

B. A. Duffy 1 Robert Wilson, NW NW Section 76, Block 8, H.&T.C. Survey, Concho County, 1 mile west of the Dodson-Wilson small discovery oil producer, made a gage of 2,225,000 cu. ft. of sweet gas and a rainbow of oil from sand at 3,220-32 ft. and was drilling below 3,255 ft.

The gas was found in a horizon said to correspond with a sand at the Floyd C. Dodson 1 Wilson, discovery well, which had a slight show of oil and gas at 3,188-93 ft. The Dodson well, however, was completed as a small pumper from the Strawn lime at 3,756-59 ft., and Duffy 1 Wilson was apparently headed for a test of the same zone, which might prove a major extension for the one-well pool.

WEST CENTRAL TEXAS COMPLETIONS

Wildcats

Brown County: Central Texas Gas 1 J. C. Clements, N. G. Anderson Sur. 2, dry, T.D. 1,944 ft.

Jones County: Butler & Horne 1 B. A. Stephenson, subd. 4, John Winters Sur. 138, dry, T.D. 2,282 ft.

Taylor County: Fain-McGaha 1 J. P. Horton, Sec. 50, Blk. 19, T.&P. Sur., dry, T.D. 3,105 ft.

Fields

Cook, Shackelford County: Roeser & Pendleton and Continental 17-A W. I. Cook estate, Sec. 117, E.T. Sur., pumped 54 bbl. natural, sand 1,710-15 ft., T.D. 1,720 ft.

Miscellaneous

Coleman County: R. M. Coleman 1 W. W. Kingsbury, Wharton C.S.L. Sur. 496, gaged 420,000 cu. ft. gas after acid, lime 2,206 ft., T.D. 2,265 ft.

Eastland County: Lone Star 3 B. P. Cozart, Sec. 478, S.P.R.R. Sur., old well plugged back, old T.D. 4,070 ft., dry.

TEXAS GULF COAST

New Fields in Prospect in Three Gulf Coast Counties

By F. L. SINGLETON

HOUSTON, Tex.—The Texas Gulf Coast district had promise of three new discoveries this week as wildcats in Colorado, Brazoria and Jefferson counties were showing favorable possibilities. In addition, important extensions were assured the new Stewart field, Jackson County, as two tests, northeast and southwest, were showing for producers.

In southwestern Colorado County, near the town of Garwood, Shell Oil Co., Inc., had apparently established a new oil field with 1 Schiurring which was being retested after the well flowed 116 bbl. of 51.9-gravity oil and 39 bbl. of water daily through a ¼-in. choke. Tubing pressure was 2,030 lb. and casing pressure 2,260 lb., with the gas volume estimated at 2,700,000 cu. ft. Total depth is 6,997 ft., with 4½-in. casing cemented at 6,198 ft. The test was made through casing perforations opposite the Yegua sand at 6,143-45 ft.

The well topped the Textularia Warreni at 4,513 ft., Hockleyensis at 5,075 ft., Dibollensis at 5,762 ft., Nonionella at 5,928 ft., Discorbis Yeguaensis at 6,027 ft., and the Eponides Yeguaensis at 6,081 ft. Three drill-stem tests were made before casing was cemented and two of these, at 6,121-38 ft. and 6,140-48 ft., recovered pipe-line oil, while the third test at 6,445-51 ft. recovered 720 ft. of water with a slight showing of oil.

The discovery is situated in the I.&G.N. Survey 6, on a block of several thousand acres. It is 5 miles due west of the town of Garwood and 6 miles northeast of the Garwood field, which produces from the Cockfield.

Hebert & Smith 1 Deaton, 2½ miles southeast of Fannett, Tex., and located on the extreme southeast flank of the Fannett field, Jefferson County, is being killed after the well attempted to blow out at a total depth of 8,868 ft. Top of the sand was tentatively established at 8,868 ft. The sand is believed to be the Frio and correlates to one of the sands that produce in the field proper. Location is in the J. W. Denny Survey.

In Brazoria County, 1½ miles northeast of the town of Velasco, Amerada Petroleum Corp. was attempting to kill 1 D. J. Sullivan after the well attempted to blow out at a total depth of 7,183 ft. Details as to where the sand was topped were not available. Location is in the M. Henry Survey.

Stewart Field Extension Assured

Some idea as to the probable size of the new Stewart field, Jackson County, was revealed this week as two wells, 2,000 ft. northeast and 3,000 ft. southwest of the discovery well, were showing for producers, while 5,000 ft. due west of the discovery well the limits of the 4,900-5,000-ft. discovery pay were defined. W. Stewart Boyle 1 Copsey, northeast of production, was flowing pipe-line oil while testing through perforated casing at 4,990-97 ft., while 1 Meyer, to the southwest, was flowing oil while testing through perforated casing at 4,960-72 ft. On the extreme west side the same operator's 1 Pagel is bottomed at 5,320 ft. and a heavier rig was being moved in preparatory to drilling deeper after no shows of oil or gas were logged. The Meyer test is reported to have checked structurally lower than the discovery well on upper markers, but cut a fault and cored a well-saturated section in the discovery pay. This fault may account for the pay being missed in the Pagel test.

In the same county, 2 miles northwest of the town of Navidad, J. A. Gray et al 1 E. B. Hall, Rose & Sample, is waiting on orders after making an electrical survey and cutting side-wall cores. Sand and shale with a gas odor was recovered in cores at 2,397 ft., 2,402 ft., and 2,403 ft. In the southeastern part of the county, 3 miles northeast of the Francitas field, Wheelock & Collins 1 Planet Oil Co., P. Green Survey, was drilling in sandy shale below 8,741 ft. The Heterostegina was topped at 6,570 ft., round Marginulina 6,780 ft., and flat Marginulina at 6,810 ft.

Gem Oil Co. 4 Kavanaugh & Collins, located in the Livingston field, Polk County, the second well to be drilled to the Wilcox, is drilling in shale below 7,280 ft. with no shows reported. Wilcox sand production was established in June of this year at 7,038-52 ft. It is reported that the present well will be drilled considerably deeper than the discovery well which was stopped at 7,300 ft.

Northeast of the Lake Creek field, Montgomery County, Superior Oil Co. of California 1 E. G. Frost perforated casing opposite the Wilcox at 13,025-40 ft. and a drill-stem test was being made. Total depth is 13,074 ft. with 7-in. casing cemented at 13,071 ft. This well is believed to be located on a separate structure than the Lake Creek field.

In Austin County, Ohio 1 First National Bank, 3 miles southeast of Orange Grove Hill, V. Flores Survey, is drilling in the Yegua formation at 6,950 ft. after topping the Cockfield formation at 5,830 ft. The Textularia Hockleyensis was topped at 4,454 ft., Textularia Dibollensis at 5,030 ft., and the Discorbis hemispherisca at 5,581 ft.

Ohio 1 McDonald, located in the North Bay City area, Matagorda County, was retested through perforated casing at 7,876-79 ft. and flowed 92 per cent oil and the balance salt water through a ½-in. choke. The well has been in the process of completion for the past several weeks.

TEXAS GULF COAST COMPLETIONS

Wildcats

Fort Bend County: H. C. Cockburn 1 Albrecht, top

(Continued on Page 100)

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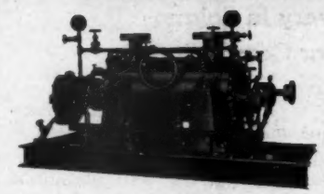
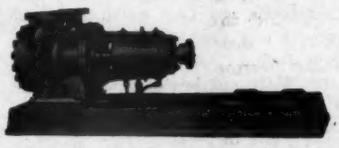
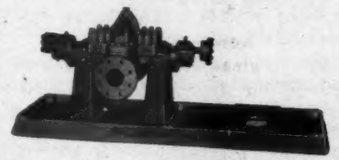


Centrifugal Pump.
Type 1, hot oil, multi-stage, horizontal

Type OV, two-stage, hot oil pump.



Type SVMB, single-stage pump.



Type KH, double suction, single-stage pump.

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Discover Additional Oil Sand In Ventura Avenue Field

By L. P. STOCKMAN

LOS ANGELES, Calif.—Alliance Petroleum Corp. greatly increased the crude-oil reserves of the prolific Ventura Avenue field early this week by completing 5 Hisey flowing 2,000 bbl. of clean 32.2-gravity oil and 2,400,000 cu. ft. of gas per day from 10,600 ft. This well is important not because it registered large production but rather because it has opened up several hundred additional feet of oil zone. Drilling operations were concluded at 10,600 ft. with the bit still in the pay and at that depth the log showed 950 ft. of highly saturated oil sand with excellent porosity. Previously, operators had stopped drilling operations when a penetration of 250 ft. had been taken but Alliance kept on drilling and only stopped at 10,600 ft. because of high gas pressure and the fact that an excellent well was definitely assured. This well shows the greatest penetration taken to date in the D-7 zone, originally designated as the Gosnell 35 zone, and its completion opens up a considerable area for deeper drilling. Unfortunately, Alliance Petroleum Corp. will not be able to show much immediate benefit due to curtailment which will restrict the well's production to about 150 bbl. per day or maybe slightly higher depending upon what the quota of the Ventura Avenue field proves to be.

It is a little difficult to estimate what the completion of 5 Hisey will mean to the entire field but it is not at all improbable that the additional thickness of oil sand may mean an increase of at least 20,000,000 bbl. of crude oil in future reserves. Subsequent drilling may prove this estimate to be radically low, especially if this D-7 zone shows a comparable thickness throughout the field. This is particularly true because the bit in 5 Hisey was still in a highly saturated oil sand and additional penetration could have been taken. A 1,000-ft. oil sand at Ventura Avenue definitely assures large production and for this reason the D-7 zone may prove one of the most prolific of the several productive zones found in this field to date. It is interesting to note while commenting on the initial daily production of 5 Hisey that the recorded initial does not represent the well's maximum potential as the flow bean was restricted because of limited storage facilities and the inability of the company to dispose of all but a very small amount of crude oil. This well is on the north flank of the structure; consequently wells nearer the axis of the structure may encounter considerably more than 950 ft. of oil sand. No well in the Ventura Avenue field has succeeded in drilling entirely through the Pliocene and for this reason the new well is situated within formations of Pliocene age.

Continental Oil Co. is considering its Holser well on Ramona anticline in the Piru section of Ventura County as a successful completion and present plans call for the starting of a new well withing a short time. The company's 1 Holser in 14-4n-18w was drilled to 5,228 ft. but was plugged back to 4,663 ft. prior to completion. The well has been on a pumping test for several weeks and at present is producing 202 bbl. of 25.2-gravity oil per day and the cut that showed up early in the well's life has cleaned up to 5 per cent. Continental's Holser well cored almost 600 ft. of oil sand, but the lower part of the hole was too tight to produce commercially and was accordingly plugged off. The Oxnard district of Ventura County is coming into the limelight again with Royalty Service Corp. already drilling ahead in 1 Leonard in 29-2n-22w at 3,000 ft., and Signal Petroleum Co. of California is preparing to start a test in 35-1n-22w on the Wiltfong property. Small production has been developed in the Oxnard district but so far the oil is very heavy and is being used for the most part in the manufacture of road oil and asphalt.

COASTAL DISTRICT COMPLETIONS

Newhall Potrero, Los Angeles County: Barnsdall Oil Co. 29 Rancho San Francisco, 27-4n-17w, flowed 1,464 bbl., 33.9-gravity, 0.4 per cent cut, 1,032,000 cu. ft. gas, 32/64-in. bean, flow pressure 600 lb., T.D. 7,553 ft., perf. 7,206-7,553 ft., comp. in third Modelo zone of Miocene age.

Ventura Avenue, Ventura County: Alliance Petroleum Co. 5 Hisey, 21-3n-23w, flowed 2,000 bbl., 32.2-grav., 0.5 per cent cut, 2,400,000 cu. ft. gas, 28/64-in. bean, pressures 1,500/1,750 lb., T.D. 10,600 ft., perf. 9,650-10,600 ft., comp. in D-7 zone of Pliocene age, this is deepest penetration taken in this zone to date and opens up additional acreage for deep-zone development.

Gas Discovery in Solano County Near Completion

Within the next few days another new gas field is expected to be proved up in Solano County at the extreme eastern end of Suisun Bay where Standard Oil Co. has been working on a potential gas well in 25-3n-1w. This well, 2-1 Suisun Community, would have been finished several weeks ago but so much gas pressure built up that gas began emerging from the boggy area surrounding the location and Standard was forced to recement the hole three times. A recent test indicates the probability that the gas has been shut off at the point where it was flowing through the annular space between the surface pipe and the 5½-in. casing that has been cemented at 6,779 ft. The gas sand found in this region is probably the equivalent of the Emigh or McDonald Island gas sand of Cretaceous age. Last week, Standard Oil Co. discovered a new gas field in the delta region of the San Joaquin Valley about 10 miles southeast of the McDonald Island gas field, and this well will be officially completed within the next few days. Standard's discovery southeast of McDonald Island is located on the Woods Community in 21-1n-5e and the top of the McDonald gas sand was cored at 5,240 ft. This means that Standard has 14 ft. of gas sand open to production although the 5½-in. casing customarily used was landed and cemented at 5,230 ft. At Rio Vista, Standard Oil Co. will also complete a new gas well next week as the 5½-in. casing has been cemented in 1-2 Midland fee in 5-3n-3e at 4,040 ft. The green sand was cored in this well at 4,040 ft. and the white sand was logged at 4,208 ft. Texas Co., which proved up the existence of commercial gas in the Bowerbank gas field of Kern County a few months ago after two other operators failed to appreciate the presence of commercial gas, is making preparations to drill a gas test in the Tuscan Springs district of Tehama County. The first well will be drilled on the Walbridge property in 32-28n-2w.

Paloma Outpost Drilling Ahead

General Petroleum Corp. failed to find a definite N point in 61-33 Gallagher, an outpost in the Paloma field, and has resumed drilling operations. The bit is at present rotating ahead at 10,600 ft. and there is a possibility that no definite N point will be found as was the case with 12-12 Kern County Land of Western Gulf Oil Co. where the shale section gradually changed to sand. This well is located out on the north flank of the Paloma structure and since the well has passed 10,600 ft. it has reached the point where the Paloma oil sand should be logged momentarily. It was recognized that deeper drilling might be required, but if this well is to result in commercial production the pay must be picked up very quickly. In the meantime, Western Gulf Oil Co., which is developing Kern County Land acreage in conjunction with the Texas Co., has foundation in for 36-1 Los Angeles Athletic Club in 1-32s-26e in the eastern end of the Paloma distillate field.

The Continental Oil Co. will soon step into the Hanford district of Kings County and drill a wildcat on the Drummond property in 36-18s-22e. This wildcat will be located in the southwest corner of the section.

SAN JOAQUIN VALLEY COMPLETIONS

Belridge, South, Kern County: E. A. Parkford 3 Belridge, 12-29s-21e, pumped 110 bbl., 13.8-gravity, 30 per cent cut, T.D. 1,102 ft., 120-mesh perf. 924-1,100 ft., comp. in upper oil zone 925-1,102 ft. of Pliocene age.

Helm, Fresno County: Amerada Petroleum Corp. 75-34 Clover, 34-16s-17e, flowed 200 bbl., 66.6-gravity, 1 per cent cut, 4,128,000 cu. ft. gas, 19/64-in. bean, flow pressure 2,625 lb., T.D. 8,023 ft., perf. 60 ⅜-in. holes 7,974-8,004 ft., McClure 5,686 ft., Temblor 5,904 ft., Kreyenhagen 7,580 ft., Eocene 7,975 ft., comp. in third Clover zone of Eocene age.

Kettleman North Dome, Fresno County: Kettleman North Dome Association, 343-28-J, 28-21s-17e, flowed 327 bbl., 60.5-gravity, 0.3 per cent cut, 4,250,000 cu. ft. gas, 48/64-in. bean, tubing pressure 2,750 lb., T.D. 10,655 ft., P.B. 10,265 ft., 180-mesh perf. 10,375-10,620 ft., bentonite 7,796 ft., Temblor 7,840 ft., comp. in McAdams zone of Eocene age.

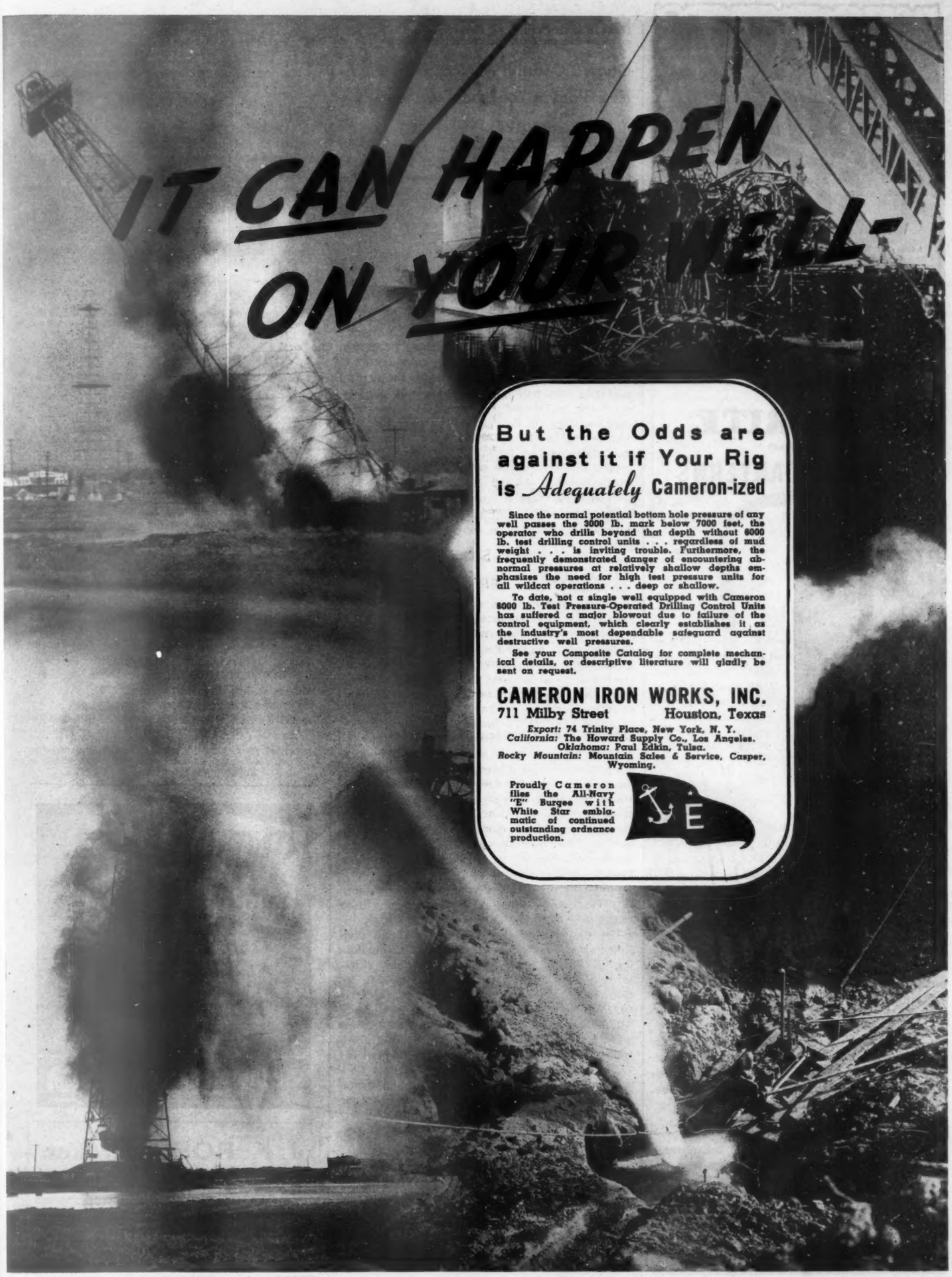
Midway-Sunset, Kern County: Standard Oil Co. 83-27-B fee, 27-31s-23e, pumped 124 bbl., 17.8-gravity, 10 per cent cut, T.D. 3,160 ft., perf. 2,596-2,656 ft., 2,736-2,955 ft., 3,115-55 ft., top so-called gusher sand 2,754 ft., Wilhelm sand 2,689 ft., producing from both zones of Pliocene age.

Third Producer Completed In Turnbull Canyon Field

Continental Oil Co. finished its third well in the Turnbull Canyon field of Los Angeles County this week but it failed to result in large production. This new completion, 3 Turnbull Community, did not have sufficient kick to result in a natural flow and the company therefore installed pumping equipment. Continental's 3 Turnbull Community is pumping 295 bbl., of 32.4-gravity oil per day and will probably settle around 300 bbl. daily as soon as the 6 per cent cut cleans up. This well, the second pumping well in the Turnbull Canyon field, is the most northerly producing well in the field and it, like 2 Turnbull Community, required whipstocking in order to intercept the pay. The new well, 3 Turnbull Community, only found a few thin stringers of oil sand in the Turnbull zone of Miocene age and after going down to 5,608 ft. the company backed up, whipstocked and redrilled to 3,801 ft. The bottom of the hole is due south of the surface location. In 2 Turnbull Community, which was located in the southern edge of the field, the bit went through a fault and found the pay absent on the south side of the fault. As a result, the company backed up in 2 Turnbull Community and whipstocked the hole northward until it intercepted the producing zone. It is interesting to note that 2 Turnbull Community showed the largest initial daily production and whereas this well came in under a natural flow, 1 and 3 Turnbull Community required pumping equipment.

Early next week Shell expects to complete 77-16 Olinda fee No. 4 in the Yorba Linda district of Orange County as on a formation test at 1,798-2,000 ft., open 1 hour, the recovery was 11 bbl. of oil with no free water. A string of 8⅝-in. casing was subsequently cemented at 1,808 ft. and preparations are under way to have this well tanking oil very soon. Foundation is in for 55-16 on the

(Continued on Page 94)



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MICHIGAN OPERATIONS

Ottawa County Wildcat Opens New Pool in Zeeland Township

By OTTO C. PRESSPRICH

SAGINAW, Mich. — Bay County development reached a new high for the year last week as four oil wells were completed for production ranging from 60 to 150 bbl. a day and a good producer, developed in the farthest-north drilling today in the Reed City field, featured the week in Michigan oil fields.

Ten oil wells were completed for initial daily potential of 2,250 bbl. In addition there were three natural-gas wells, one producing 11,700,000 cu. ft. a day, while five other wildcat tests were completed as dry holes.

Michigan oil men were concerned at the week's end at Petroleum Coordinator Ickes prohibited railway delivery of automobile gasoline in 20 states, including Michigan. However, the Central Michigan area will feel the pinch only slightly, according to Edward F. Clagett, Michigan manager for Pure Oil Co., who pointed out that this area is supplied by tank trucks from water shipment terminals at Bay City, Clagett said it appeared that the Detroit area may be hard hit.

July crude-oil production figures announced by the Michigan Oil and Gas Association showed better than 4,000-bbl.-a-day decline, as compared with June when the value of Michigan oil and gas approached the $3,000,000 mark with an output of 1,985,793 bbl. of crude and 912,607,000 cu. ft. of gas. Combined value at the wells was $2,888,455, according to the state Revenue Department's severance division which reported severance-tax payments for the month totaled $57,768.

On the basis of association reports, July production was 1,901,199 bbl. from 3,221 wells which produced an average of 61,329 bbl. a day. The decline was accounted for principally by 1,500-bbl. drops in output from Reed City and Roscommon County fields.

Ottawa County Wildcat Is Producer

A wildcat test from which initial production after acid treatment was 125 bbl. a day, was among the interesting developments in field operations last week. The test is the C. A. Perry 1 Mast in Section 32, Zeeland Township, Ottawa County, completed at a depth of 1,479 ft. In Section 5 of that township D. M. Leonard, trustee, tried a deep test which failed, drilling 1 Ponstein-Vereeke wildcat to 3,385 ft.

Pure's northernmost Lincoln-Osceola producer is 1 Clark in Section 18. Acid treatment lifted initial flow to 60 bbl. an hour.

The state Conservation Department lands division has set September 4 as the day for auctioning of oil and gas leases on more than 25,000 acres of state-owned land. The offering will include 1,640 acres in Arenac County, 2,662 in Clare, 10,480 in Crawford, 400 in Iosco, 1,635 in Mecosta, 361 in Missaukee, 120 in Muskegon, 1,235 in Ogemaw, 5,446 in Roscommon and 1,493 in Wexford.

Last week's list of new drilling permits involved 10 locations in seven counties as the state Conservation Department approved projected operations as follows: Two each in Allegan, Arenac and Bay counties; one each in Clare, Clinton, Isabella and Ottawa. The issue boosted the 1942 permit total to 365.

MICHIGAN COMPLETIONS

Allegan County, Trowbridge Township: John F. Burton 2 Marble & Parkes communitized, NE SW NE 31-1n-13w, pumped 22 bbl., acidized, T.D. 1,361 ft.

Bay County, Kawkawlin Township: C. W. Jones et al 2 Laracy, C S½ NE SE 25-15n-4e; pumped 60 bbl., acidized, T.D. 2,845 ft.

Monitor Township: Gulf Refining Co. 2 Leonard, C N½ NW NW 3-14n-4e, pumped 60 bbl., acidized, T.D. 2,926 ft.

Gulf Refining Co. 1 Prevost, C S½ NE NE Sec. 11, flowed 100 bbl. first 18 hr., T.D. 2,893 ft.

Chapman Oil Co. 3 Ruegsegger, C N½ SW NE Sec. 11, flowed 170 bbl., acidized, T.D. 2,935 ft.

Clare County, Winterfield Township: Taggart Brothers Co. 103 Sample-Bulman, C N 31-20n-6w, 11,700,000 cu. ft. gas, T.D. 1,329½ ft.

Taggart Brothers Co. 121 Baron-Consumers Power Co., C NE Sec. 34, 867,000 cu. ft. gas, T.D. 1,311½ ft.

Franklin Township: Eugene Hilliard 1 Pinch, C N½ NE NE 10-20n-3w, acidized for 28 bbl., T.D. 4,197 ft.

Gratiot County, Lafayette Township: Charles W. Teater 1 Davis, C E½ NE NE 34-11n-1w, wildcat, dry, T.D. 3,162 ft.

Isabella County, Lincoln Township: Michigan Devonian Petroleum Co. 1 Mannausau, C S½ SW NW 4-13n-4w, wildcat, dry, T.D. 3,765 ft.

Livingston County, Marion Township: Arthur F. Etienne 1 Eisner, NE SW SE 7-2n-4e, wildcat, dry, T.D. 2,286 ft.

Osceola County, Lincoln Township: Pure Oil Co. 1 Clark, C S½ SE SE 18-18n-10w, 1,440 bbl., T.D. 2,937 ft.

Richmond Township: Ohio Oil Co. A-1 Clark, C N½ NW SW 4-17n-10w, acidized for 160 bbl., T.D. 3,547 ft.

Ottawa County, Tallmadge Township: Smith Petroleum Co. 1 Lautenbach et al, SW SW SW 27-7n-13w, 1,170,000 cu. ft. gas; T.D. 1,139 ft.

Zeeland Township: D. M. Leonard, trustee, 1 Ponstein-Vereeke communitized, SW NW SW 5-5n-14w, wildcat, dry, T.D. 3,385 ft.

Clifford A. Perry 1 Mast et al; SE NW NW Sec. 32, wildcat, pumped 125 bbl. acidized, T.D. 1,479 ft.

Roscommon County, West Nester Township: Racine Oil Co. 1 Peiser, SE SW SE 35-21n-2w, wildcat, dry, T.D. 4,397 ft.

Richfield Township: Sun Oil Co. 2 Bauman, C N½ NW NE 29-24n-1w, flowed 37 bbl., acidized, T.D. 4,204 ft.

California Fields

(Continued from Page 92)

same property which was bought in fee several years ago from Olinda Land Co. This drilling is being done by portable equipment and consequently it does not require more than a foundation before starting active drilling. Based on what was found in a core hole drilled several years ago, wells in this new productive area should produce on the beam around 500 bbl. per day of 18-gravity oil from around 2,050 ft. The status of the Buena Park field of Orange County is hanging in the balance while Texas Co. conducts further tests on 4-1-E Buena Park, which had been bottomed at 10,044 ft. but plugged back to 9,270 ft.

LOS ANGELES BASIN COMPLETIONS

Turnbull Canyon, Los Angeles County: Continental Oil Co. 3 Turnbull Community, 13-2s-11w, pumped 295 bbl., 23.4-gravity, 6 per cent, T.D. 5,608 ft., redrilled to 3,801 ft., perf. 3,410-3,800 ft., comp. in Turnbull Canyon oil sand of Miocene age, cleaning up and building up slightly.

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APPALACHIAN FIELDS

Breakdowns Delay Deep Tests In Lower Eastern Fields

PITTSBURGH, Pa.—None of the deep tests in the lower Eastern fields reached important markers during the week as several were delayd by breakdowns.

SOUTHWEST PENNSYLVANIA COMPLETIONS

Allegheny County, Plum Township: Equitable Gas Co. 1 Anton Block, 152,000 cu. ft. gas, Bradford sand 4,010-42 ft., gas 4,012 and 4,034 ft., T.D. 4,068 ft.

Butler County, Buffalo Township: T. W. Phillips G. & O. Co. 2 Grant Shuster, 17,000 cu. ft. gas, Speechley sand 2,822-82 ft., gas 2,827 ft., T.D. 3,189 ft.

Greene County, Center Township: Manufacturers Light & Heat Co. 2 Isaac Orndoff, 15,000 cu. ft. gas, Big Injun 1,990 ft., gas 2,100 ft., T.D. 3,269 ft.

Monongahela Township: L. J. Houze Convex Glass Co. 2 E. R. Gabler, 180,000 cu. ft. gas, Big Injun 1,514 ft., gas 1,568-72 ft., gas 1,654-58 ft., T.D. 1,662 ft.

Springhill Township: Grimm Caldwell Oil & Gas Co. 1 L. O. Barnhart 101 acres, Fourth sand, T.D. 3,380 ft., 200,000 cu. ft. gas.

Washington County, Morris Township: Manufacturers Light & Heat Co. 1 E. O. Parkinson, 48,000 cu. ft. gas, Gantz sand 2,818 ft., gas 2.820-24 ft., R.P. 145 lb., T.D. 2,966 ft.

South Franklin Township: H. Williams 1 Jason Buchanan, drilled deeper, 100,000 cu. ft. gas, T.D. 1,262 ft.

Westmoreland County, Bell Township: Peoples Natural Gas Co. 2 H. C. Sparber, 582,000 cu. ft. gas, Tiona sand 2,949-55 ft., gas 2,952 ft., T.D. 3,002 ft.

WEST VIRGINIA

In Union district, Pleasants County, Benedum & Trees reached 5,240 ft. in the Oriskany test on the W. W. Campbell farm and due to severe caving at that point are running casing. In Ritchie County, their test on the L. J. Rinehart farm in Grant district was held up for engine repairs at 6,800 ft. In Meade district, Tyler County, these operators are still fishing at 6,035 ft. in the test on the Pearl Broadwater farm. In Spring Creek district, Wirt County, the same operators have resumed drilling the deep test on the Park Smith farm and reached 2,470 ft.

In Hancock County, John T. Galey et al are having trouble in the Oriskany test on the Lenora Ramsey farm in Clay district at 4,560 ft. where the hole has been twice cemented and still is making little headway due to cave. There have been several gas blowouts due to pockets.

Boone County, Crook district: Hope Natural Gas Co. 8624 Dora E. Hopkins, 20 bbl. and 300,000 cu. ft. gas, Big lime 2,474 ft., production from Berea, T.D. 3,219 ft.

Braxton County, Birch district: Pittsburgh & West Virginia Gas Co. 7861 Eliet Carte, dry, through Injun sand, T.D. 2,340 ft.

Calhoun County, Center district: Hope Natural Gas Co. 8615 Parr-Lewis, 622,000 cu. ft. gas, sand 538-80 ft., white sand 972-1,045 ft., sand 1,112-1,220 ft., sand 1,225-60 ft., sand 1,570-90 ft., gas 1,112-20 ft., gas 1,225-60 ft., gas 1,570-90 ft., T.D. 1,600 ft.

Washington district: Guy Boggess Drilling Co. et al 1 W. F. and Ida Conrad, dry, Little lime 1,810-60 ft., Big lime 1,867-1,975 ft., Gritty lime 1,994-2,032 ft., T.D. 2,050 ft.

Southeastern Gas Co. 1 Simond Arnold, 14,900 cu. ft. gas before shot, first Salt 1,300-25 ft., second Salt 1,455-1,520 ft., Blue Monday 1,580-1,610 ft., Big lime 1,610-1,702 ft., Injun 1,717-86 ft., gas 1,476-86 ft., gas 1,775-1,783 ft., oil show 1,503-4 ft., T.D. 1,803 ft.

Clay County, Buffalo district: Pittsburgh & West Virginia Gas Co. 7851 Elk River Coal & Land Co., 131,000 cu. ft. before shot, Injun sand, T.D. 2,229 ft.

Gilmer County, DeKalb district: Clem S. Morris 3 W. S. Barnes, 8,000 cu. ft. gas and ⅛ bbl. oil, Injun sand, T.D. 2,088 ft.

Lewis County, Freemans Creek district: Hope Natural Gas Co. 8610 J. D. Lovett, P.B. from Oriskany sand, 6,997 ft. to 2,585 ft., 2,041,000 cu. ft. gas, Gantz sand 1,820-70 ft., gas 1,820-65 ft., Fifty Foot 2,146-60 ft. This well has been drilled with a rotary.

Lincoln County, Jefferson district: David Gas Co. 2 Judy Britton and Dora Hill, 1,017,000 cu. ft. gas, Big lime 1,715-1,910 ft., Injun 1,910-35 ft., Berea 2,409-34 ft., shot 2,691-3,831 ft., R.P. 460 lb., T.D. 3,831 ft.

United Fuel Gas Co. 2416 Richard Miller, drilled deeper, 622,000 cu. ft. gas, start 2,460 ft., Brown shale 3,495-4,680 ft., T.D. 3,984 ft.

Putnam County, Curry district: Massey Oil & Gas Co. 1 G. H. Edwards. 231,000 cu. ft. gas, Big lime 1,430 ft., Injun 1,620 ft., Berea 2,119 ft., T.D. 2,150 ft.

Ritchie County, Union district: Hope Natural Gas Co. 1 J. A. Haddox, 200,000 cu. ft. gas, Injun sand, T.D. 2,153 ft.

Raleigh County, Trap Hill district: Godfrey L. Cabot, Inc., 2 Rockhouse Fork Land Co., 60,000 cu. ft. gas, Big lime, T.D. 2,750 ft.

Wetzel County, Church district: Shriver Oil & Gas Co. 2 S. M. Shriver, dry, through Fifth sand, T.D. 3,547 ft.

ORISKANY GAS FIELDS

Jackson County, Ripley district: West Virginia Gas Corp. 1 B. F. Rader, 5,738,000 cu. ft. gas, Oriskany 4,956 ft., T.D. 4,980 ft.

Kansas Fields

(Continued from Page 86)

Kraft-Prusa, Barton County: Shell 2 Herthel, NE SE NW 15-17-11w, swabbed 243 bbl. in 3 hr., Arbuckle 3,270-89 ft.

Skelly 3 Grosshardt, NE NW NE 15-17-11w, pumped 125 bbl., Arbuckle 3,289-89¼ ft., T.D. 3,301 ft.

McLouth, Jefferson County: E. V. Jackson 1 Houston, NW SE 15-9-20, dry, T.D. 1,453 ft.

Magnolia 1 Edmonds, SE NW 17-9-20, pumped 15 bbl., sand 1,466-97 ft.

McLouth, Leavenworth County: McLaughlin 2 Schmidt, SE SW 1-10-20, 1,260,000 cu. ft. gas, sand 1,385-1,425 ft., T.D. 1,450 ft.

McLaughlin 1 Chapman, SE NW NW 12-10-20, dry, T.D. 1,428 ft.

Morel, Graham County: Continental and Cities Service 2 Morel, NE cor. 15-9-21w, swabbed 108 bbl. in 8 hr., Arbuckle 3,692-3,720 ft.

Peace Creek, Reno County: Cities Service 5 Snowbarger, SE NW 22-23-10w, flowed 108 bbl. in 6 hr., Viola 3,793-3,800 ft.

Texas 1 Hornbaker, NW NE 32-23-10w, 416,000 cu. ft. gas, Viola 3,634-40 ft., T.D. 3,795 ft.

Leader Oil 3 McMurray, SW NE SE 10-23-10w, pumped 61 bbl., Viola 3,775-76 ft, T.D. 3,786 ft.

Leader Oil 9 Tonn, SW NE SW 11-23-10w, flowed 30 bbl. an hr., through choke, Viola 3,763-64 ft.

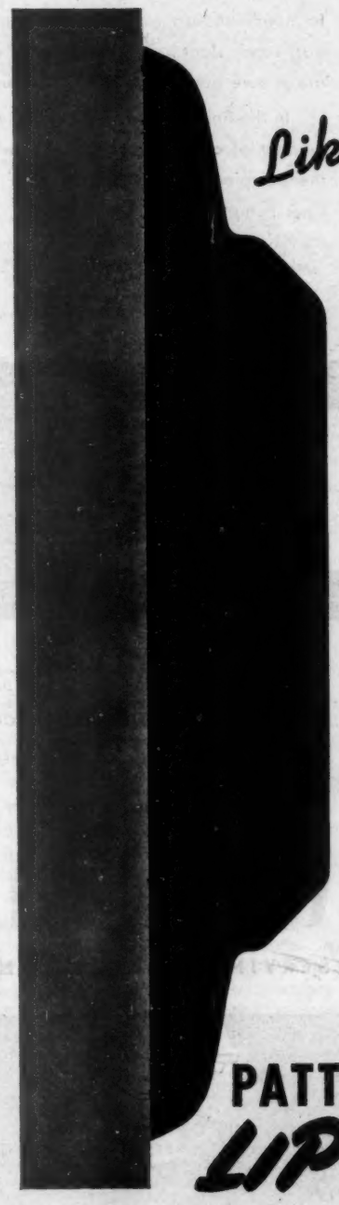
Sinclair Prairie 1 Crandall, NW SE 14-23-10w, flowed 41 bbl. in 1 hr., Viola 3,760-68 ft.

Ray, Norton County: Cities Service 2 Kitzke, NE SE SE 36-5-21w, dry, T.D. 3,611 ft., Lamotte 3,598 ft.

Trapp, Barton County: Continental 2 Susank, SE NW SE 19-16-13w, pumped 372 bbl., Arbuckle 3,383-95 ft., T.D. 3,400 ft.

Bartlett & Crum 1 Redetzke, SW SW SE 20-16-13w, pumped 60 bbl., Arbuckle 3,392-95 ft.

Virgil, Greenwood County: Rhodes & Dougherty 4 Bays, SE NE SE 17-23-13, pumped 15 bbl., Mississippi lime 1,774-88 ft.



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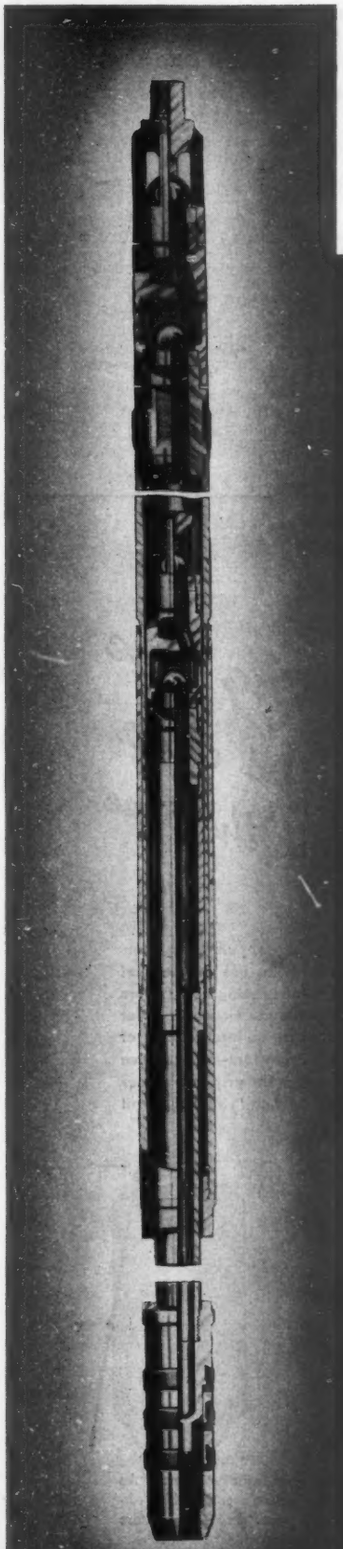

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Buy U. S. WAR BONDS AND STAMPS

Permian Lime Discovery May Extend West Fuhrman Pool

By ROBERT INGRAM

MIDLAND, Tex.—Opened last week was a new Permian lime pool in Andrews County between the West Fuhrman pool and the so-called Mascho pool to the south. Discovery well was Siemoneit Drilling Co. 1 Texaco-University, SE NE NE Section 10, Block 10, University Survey.

Good bet was that the discovery, instead of being a new pool, was an extension south for West Fuhrman, itself a 1942 discovery, and probably a link with the pool opened in June by Mascho Oil Co. 1 Sun-University in Section 27, Block 10. West Fuhrman is 1½ miles north of the Siemoneit well, and Mascho is 2¾ miles south and slightly east. The three areas line up in an apparent trend running just about parallel with the West Andrews area, which is shaping up to the west.

Also in line with this apparent trend is the Emma pool at the southern edge of the county. The pay zone at Emma (4,200 ft.) is about 200 ft. higher than at Mascho, about 300 ft. higher than at the Siemoneit well and about level with the West Fuhrman discovery, but this variance does not preclude the possibility of a common major field covering the entire area.

The Siemoneit well was drilled in about 2 months ago, but has been shut down for a pump since that time and had not been given an official potential test until last week. Main pay was topped at 4,534 ft. and was drilled to 4,580 ft. It was shot with 570 qt. of nitroglycerin.

New Pay at Fullerton

Fullerton Oil Co. 5 H. M. Wilson, SE SE Section 15, Block A-32, P.S.L. Survey, southeast offset to the No. 1 discovery well, apparently opened a new pay for the deep Permian lime field but was drilling ahead at week's end, headed for the regular zone. The well flowed 18 bbl. of oil an hour through 2-in. tubing set at 6,880 ft., total depth 6,881 ft. The zone had previously been treated with 8,000 gal. of acid. Pay in the No. 1 well was topped at 7,130 ft. and drilled to a total depth of 7,280 ft.

Meantime, on the south side of the field, Fullerton 1-A Wilson, NW NE Section 16, Block A-32, a ⅜-mile extension, was deepened to 7,218 ft. after testing a flow of 6 bbl. an hour at 7,117 ft. after acid treatment. Operators were preparing to test again. Fullerton 1-B Wilson, NE NE Section 20, had drilled to 6,885 ft. in lime.

Deep Lime Identified at Wildcat

South and west of the Fullerton area in Andrews County, Atlantic Refining Co. 1-A Texu, SE NE Section 9, Block 12, University Survey, was drilling below 9,396 ft. in white lime. The well had red shale conglomerate at 9,195-9,230 ft. and then went into the lime, believed to be pre-Pennsylvanian. A tentative pick on the Pennsylvanian, from study of the formations, was 8,120 ft.

Late in July it was thought that the Simpson (middle Ordovician) had been reached at 8,075 ft. Others picked the top at 8,105 ft. and still others thought the formation was still Pennsylvanian. However, there was a drilling break from 9,195-9,230 ft., composed of red shale and conglomerate, which was probably the base of the Pennsylvanian.

A slight showing of oil was recorded at 9,300-03 ft. by an electrical log.

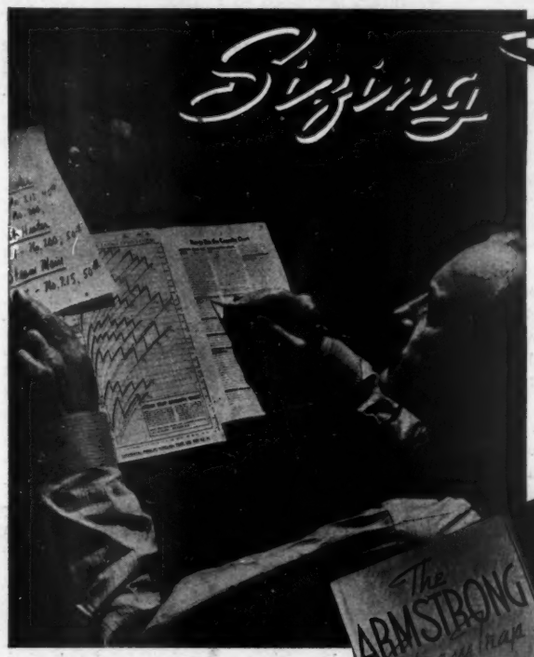
Gaines Show Disappoints

The Texas Co. 1 Robertson, Section 25, Block A-21, P.S.L. Survey, wildcat in the Kirk area of southwestern Gaines County which had been showing for a producer from the Tubb zone at 6,455 ft., was shut down at week's end after several zones tested dry. Operator had perforated casing at 6,444-60 ft., and the zone tested dry; it also tested dry through perforations at 6,465-73 ft., and bailed sulfur water through perforations at 6,473-81 ft. and at 6,481-85 ft. The hole had been plugged back from 7,686 ft.

Wildcat Progress

In Terry County, Continental 1 Auld, Section 91, Block 4-X, E.L.&R.R. Survey, 10 miles northeast of Brownfield, had reached 5,200 ft. in lime. In Lubbock County, J. R. Sharp 1 Elliott, Section 33, Block B-5, E.L.&R.R. Survey, 2 miles southwest of Shallowater, was in sandy lime and anhydrite at 5,179 ft. In Martin County, Magnolia 1 Powell, Section 18, Block 35, Township 1n, T.&P. Survey, 8 miles north of Stanton, was drilling in sandy lime at 8,025 ft. with no shows.

(Continued on Page 108)



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ROCKY MOUNTAIN AREA

Deep Tests May Be Drilled In Old Cisco Gas Field

By T. R. INGRAM

DENVER, Colo.—The Government's auction sale of oil and gas leases in the old Cisco gas field, Grand County, Utah, at Salt Lake City on August 12, when 20 separate parcels aggregating 13,500 acres were offered, resulted in the sale of leases on 12 parcels to J. E. Evans, Los Angeles, Calif., whose bid of 6 cents an acre was submitted by Charles A. Fleming. Fleming also made a bid in his own name of 5 cents an acre.

The field was a prolific producer of gas 18 to 20 years ago, the producing horizon being the Dakota sands, but was depleted by the use of gas in a carbon plant operated by the Crystal Carbon Co. All the wells subsequently were plugged with the exception of one which was saved for observation and showed an increase in pressure which has built up to where commercial production may again be expected. The field has never been tested below the Dakota except in one well which went to the equivalent of the Sundance at 3,045 ft. Thirty-five miles to the south of the Cisco field are the Colorado River structures which were tested a number of years ago. Oil was found in streaks of sand and shale in unusually thick beds of salt, but no beds capable of making suitable reservoirs were encountered. These explorations extended over into Montrose County, western Colorado, with similar results in several wells drilled by the majors. The oil is supposed to have its origin in the Pennsylvanian.

The Cisco operation was unitized under a plan approved on June 6, 1942, and the sale required the lessee to enter his holdings under the unit agreement. It is understood that these plans are preliminary to deep testing. The 12 parcels bid in by Evans are in Sections 8, 11, 12, 14, 15, 20, 23 and 24-20s-21e and 11-21s-22e. They surround the acreage which was productive in the Dakota years ago.

Bowdoin Gas Field Active

The Montana-Dakota Utilities Co., operator for the Bowdoin Dome unit, Phillips County, Montana, is conducting an aggressive drilling campaign and reported five completions the past week and five new operations. One well was a dry hole, the only one abandoned in the recent past.

Kal-Bar Production Co. 2 fee, in 13-35-2w, Kevin-Sunburst field, was turned into a good producer from a dry hole. The contact was dry. It was given a shot with 80 qt. and a small show of oil resulted. It was then acidized and responded by filling a 250-bbl. tank in less than a day. On a 10-day test it averaged 160 bbl. a day. It is ¼-mile east of Coolidge & Coolidge 4 Waite, which in June averaged 150 bbl. daily for 10 days without acidizing. These wells are in an area where 25 to 50-bbl. producers are usual.

Gas Found on Sherrard North Dome

Sinclair-Wyoming 1 Anderson, on the north dome of the Sherrard structure, Carbon County, Wyoming, is classed as a discovery for 3,500,000 cu. ft. in the Frontier after plugging back from the Tensleep. It is 3½ miles northwest of the same company's 1 Mary Carter, the discovery last April on the south dome which made 8,000,000 cu. ft. after finding the Tensleep dry and plugging back.

F. F. Hintze has resumed operations on Spring Creek in 1 Government, NW NW 7-28n-92w, after being shut down for 2 years. He is drilling at 1,160 ft. in the Frontier. In January 1940 the well gaged 3,000,000 cu. ft. at 1,030-1,112 ft., open 10 minutes. After standing open for 20 minutes it dropped to only 500,000 cu. ft.

The monthly statement of the Montana Oil Conservation Board shows some interesting changes in June as compared with June 1941. Production, all fields, this year was 696,943 bbl., an increase of 89,917 bbl. over June 1941. Storage at the end of June was 1,217,339 bbl., a decrease of 80,483 under the same period last year. Oil refined in Montana the past June was 527,818 bbl., an increase of 54,126 bbl. over June of last year. Exports to Canada were 144,839 bbl., a jump of 141,294 bbl. over the preceding year. It shows, in brief, that production, local consumption and exports have gone ahead, and that storage is being reduced.

WYOMING COMPLETIONS

Byron field, Big Horn County: Ohio Oil Co. 1 W. J. West, Lot 115 (approx. NE NE NE) 25-56n-97w, T.D. 5,491 ft., 7-in. 5,400 ft., pumped 325 bbl. from the Tensleep.

Oregon Basin, Park County: Ohio Oil Co. 1 Government, Tract 3, NW NW NE 32-51n-100w. T.D. 3,683 ft., 5½-in. 3,593 ft., pumped 400 bbl. from the Embar after acid.

Sherrard dome, Carbon County: Sinclair-Wyoming Oil Co. 1 A. B. Anderson, SE SE SE 14-25n-89w. T.D. 4,995 ft., top Tensleep 4,966 ft., dry, P.B. to 2,914 ft., comp. for 3,500,000 cu. ft. through perf. opposite Frontier at 2,315-30 ft.

South Cole Creek, Natrona County: General Petroleum Corp. 17-17-P, NW SW SW 17-34n-76w. T.D. 7,214 ft., dry in Wall Creek at 7,010-7,191 ft., tested Shannon at 4,895-4,902 ft., without results.

MONTANA COMPLETIONS

Bowdoin field, Phillips County: Montana-Dakota Utilities Co. No. 692, C SW 32-33n-32e. T.D. 1,138 ft., Bowdoin sand 875-906 ft., Phillips sand 1,080-1,110 ft., 5½-in. 870 ft., 4½-in. perf. liner on bottom, 396,000 cu. ft., 290 lb. shut-in pressure.

Montana-Dakota 694, C SW 28-33n-32e. T.D. 1,153 ft., Bowdoin 840-90 ft., Phillips 1,010-40 and 1,095-1,125 ft., 310,000 cu. ft., 250 lb. pressure.

Montana-Dakota 706, SE NW SE 2-32n-33e, T.D. 998 ft., Bowdoin sand 735-95 ft., Phillips 925-75 ft., 606,000 cu. ft., 270 lb. pressure.

Montana-Dakota 707, SE NW SE 3-32n-33e, T.D. 990 ft., Bowdoin 727-70 ft., Phillips 920-55 ft., 606,000 cu. ft., 285 lb. pressure.

Montana-Dakota 695, NE SW SW 29-33n-32e, T.D. 1,250 ft., dry, no gas in Bowdoin, only show in Phillips.

Cedar Creek, Fallon County: Montana-Dakota 164, NE SW SW 25-5n-60e. T.D. 749 ft., 8⅝-in. 99 ft., 7-in. 750 ft., 4½-in. liner 582-750 ft., 1¼-in. perf. tubing 749 ft., 500,000 cu. ft., 196 lb. pressure.

Montana-Dakota 161, C SW 13-5n-60e. T.D. 777 ft., perf. 4½-in. 605-777 ft., 1,400,000 cu. ft., 180 lb. pressures.

Hardin district, Big Horn County: Big Horn Oil & Gas Developing Co. 46, NE NW SE 20-1s-33e. T.D. 677 ft., 7-in. 42 ft., 3-in. 645 ft., 61,000 cu. ft. from Frontier at 652-666 ft., 105 lb. pressure.

Kevin-Sunburst, Toole County: Prevol & Shay 2 Government SE NE NE 15-35n-3w. T.D. 1,840 ft., dry in contact at 1,765-70 ft., acid, 500 gal., averaged 35 bbl. on 10-day test.

Kat-Bar Production Co. 2 fee, C NE SE 13-35n-2w, T.D. 1,657 ft., P.B. to contact 1,617 ft., dry, shot 80 qt., small show oil, acid. 500 gal., averaged 160 bbl. daily on 10-day test.

Rattlesnake Butte, Petroleum County: Watson Oil Co. 2 Austed, NW SW SE 22-12n-28e. T.D. 2,797 ft., first Cat Creek sand 2,545-90 ft., second Cat Creek 2,762-93 ft., small show oil, little water, plugged and abandoned.

Illinois Fields

(Continued from Page 88)

Ste. Genevieve 3,145 ft., Rosiclare 3,172 ft., Fredonia 3,250 ft., McClosky 3,211 ft.

Texas 2 Warren, W½ SW SE 22-1s-6e, pumped 107 bbl. oil and 136 bbl. water, perf. 3,188-3,200 ft., 1,000 gal. acid, reacidized 3,000 gal., perf. 3,200-10 ft., 3,188-3,210 ft., 1,500 gal. acid, McClosky 3,188-3,210 ft., 3,233-41 ft., T.D. 3,247 ft.

Texas 1 J. D. Jones, W½ NW NW 34-1s-6e, pumped 329 bbl., 2,000 gal. acid, McClosky 3,168-86 ft., 3,188-97 ft., T.D. 3,211 ft.

South Mason, Effingham County: S. D. Jarvis 1 Boyce, NW SW NE 34-6n-5e, pumped 150 bbl., natural. Benoist sand 2,242-59 ft., T.D. 2,259 ft.

Woodlawn, Jefferson County: Duncan et al 1 Laney Comm., NE SW 25-2s-1e, pumped 77 bbl. oil and 100 bbl. water, 8-qt. shot 2,017-21 ft., pay 2,008-11 ft., Cypress 1,843 ft., T.D. 2,021 ft.

Eastern Texas

(Continued from Page 84)

Survey, was drilling in shale and lime at 3,755 ft. on its deep test.

Two Smackover Tests Under Way

Two wildcats were drilling toward the Smackover lime, both of them on the north edge of the Tyler Woodbine basin and both probably seeking structural traps rather than shoreline accumulations. On the north side of the Talco field in Franklin County, White & Vaughn 1 Jackson, Hopkins Survey, was drilling below 5,021 ft. in upper Glen Rose. In Bowie County, P. D. Bowlen 1 A. L. Simms, H. G. Williams Survey, was spudded and set surface casing.

EAST TEXAS COMPLETIONS

Fields

Cayuga, Anderson County: Tide Water and Seaboard 17 J. N. Edens, D. Snyder Sur., flowed 193 bbl. through ¼-in. choke, perf. 4,021-24 ft., T.D. 4,027 ft.

East Texas field, Kilgore district, Rusk County: Jackson & Wise and Markham 6 C. O. Christian, J. S. Whitmar Sur., flowed 65 bbl. an hour through 2-in. tubing, sand 3,712 ft., T.D. 3,727 ft.

Rockford Clutches

Right: Rockford Power Take-Offs fit S.A.E. flywheel housings. Shown with Rockford O-C Clutch.

Left: A large Rockford Spring-Loaded Clutch. Spring-Loaded types work like automobile clutches; O-C types lock in or out of engagement.

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Hawkins, Wood County: R. J. Caraway et al 1 J. H. Burtin and R. W. Fault, J. P. Moseley Sur., junked, T.D. 4,840 ft.

Humble 1 D. Parrish, W. Parker Sur., dry, T.D. 4,611 ft.

Texas 5 A. D. Snyder, J. P. Moseley Sur., flowed 94.88 bbl. in 6 hr. through ¼-in. tubing choke, perf. 4,700-12 ft., T.D. 4,818 ft.

EAST TEXAS BORDER COMPLETIONS

Carthage, Panola County: Glassell & Glassell 3 Frost Lumber Co., J. H. Gibson Sur., gaged 9,800,000 cu. ft. gas from Rodessa, and 19,800,000 cu. ft. gas from lower Pettit, T.D. 6,035 ft.

Ohio Fields

(Continued from Page 87)

E. Waller, Sec. 11, dry, Little Cinnamon, T.D. 650 ft.

Washington County, Barlow Township: D. T. Orndoff 2 M. G. Bell, Sec. 30, dry, Salt sand, T.D. 1,230 ft. (old gas well deepened).

Grandview Township: Chas. Alloway 1 Noah Ward, Sec. 5, 40 bbl., 200,000 cu. ft. gas, Injun, T.D. 1,540 ft. (old well deepened from 675 ft.).

Liberty Township: Burkhart 3 J. Hall, Sec. 4, 30,000 cu. ft. gas, show oil, Keener & Injun (Squaw dry), T.D. 1,460 ft.

Best Run O. & G. 1 B. K. Koon, Sec. 28, 100,000 cu. ft. gas, shot, Germantown sand, T.D. 1,295 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—One oil well was drilled in and one gas well was completed in eastern Kentucky last week, with operations hitting a slightly slower tempo in some sections. The oil well opens a new pool in Greenup County as other tests in that general area have been gas wells.There is no pipe-line connection at present and production, if sold, must be delivered by tank wagons. It is understood that other wells are to be drilled in the area.

EASTERN KENTUCKY COMPLETIONS

Floyd County: Kentucky-West Virginia Gas 5403 Sylvester Hall, Frazier Creek, flowed 603,000 cu. ft. of gas, T.D. 3,407 ft. in shale, shot.

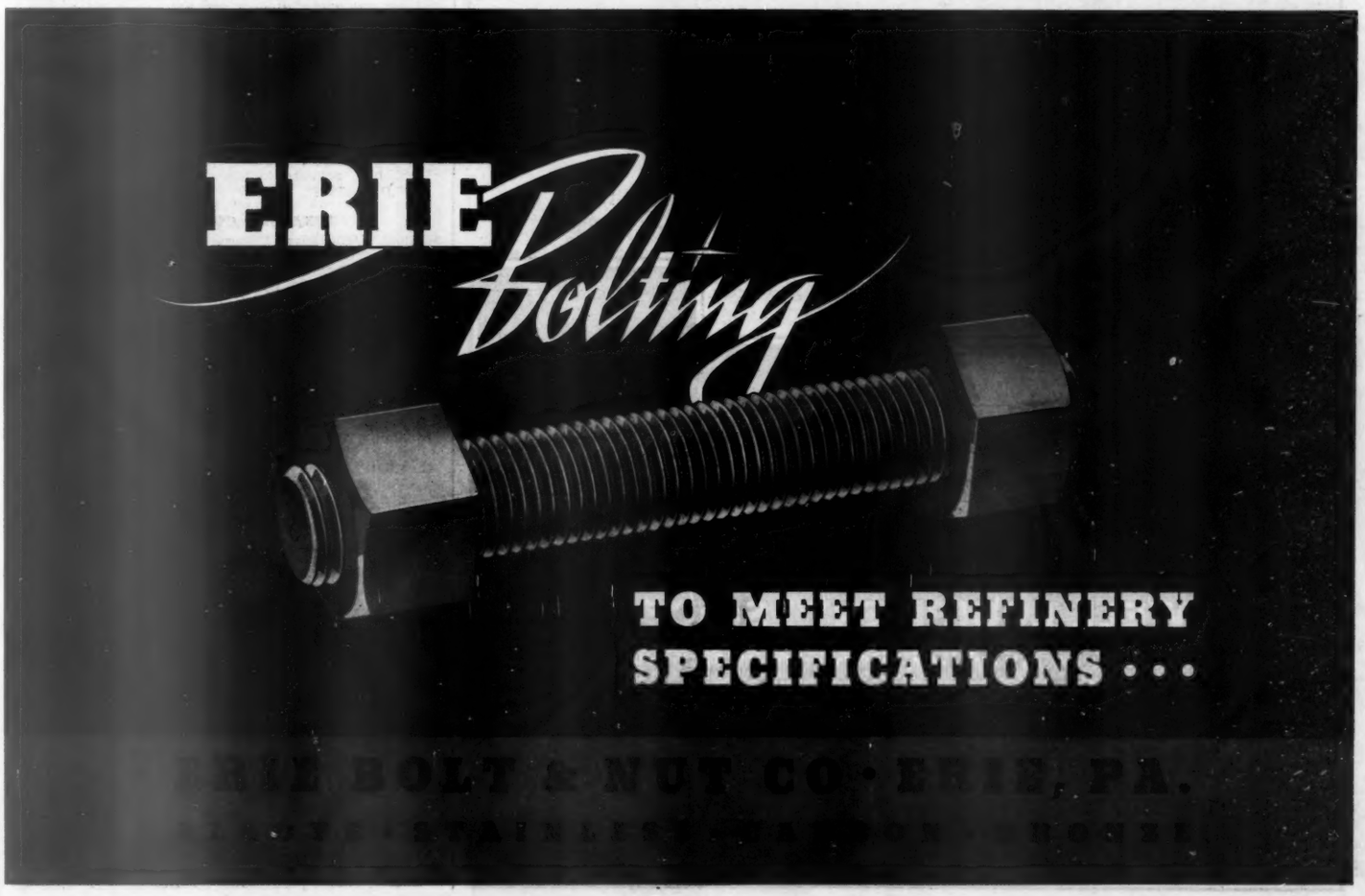
Greenup County: G. C. McCool et al 1 Evans, Hunnewell postoffice, flowed 10 bbl. of oil a day, T.D. 900 ft. in Berea sand, shot.

Summary of Operations, July

COMPLETIONS reported for July show a marked increase over the previous month. However, the figures are not comparable as July covers a 5-week period compared to 4 weeks in June. With the exception of a few areas, a leveling-off point in drilling operations is reflected in the weekly completions throughout the country. Exploration work, which has been carried on at a fairly steady pace, should show an upturn within the next few months due to intensified wildcatting in Kansas, East, West and Coastal Texas and also in the North Louisiana area.

While last month's total completions were approximately 40 per cent under the corresponding period last year, the July total has moved up to 50 per cent. There were 3,165 completions in July 1941, of which 2,180, or 69 per cent, were oil wells. The percentage of oil wells to the total number drilled has dropped to 53 per cent in 1942, due in part to the proportionately larger share of wildcats being drilled.

	Comp.	Oil	Prod.	Gas	Completions: Dry	Under 1,000 ft.	1,000-2,500 ft.	2,500-5,000 ft.	5,000-10,000 ft.	Over 10,000 ft.	Footage	Drlg.
Appalachian	332	214	533	92	26	10	261	31	30	0	684,657	308
Ohio	113	30	864	50	33	23	38	51	1	0	268,956	209
Indiana	32	13	1,254	1	18	7	17	8	0	0	55,663	43
Kentucky	19	1	20	16	2	0	8	11	0	0	50,856	59
Michigan	73	24	2,525	15	34	2	39	32	0	0	172,947	122
Illinois	196	102	17,515	2	92	12	56	128	0	0	505,050	177
Kansas	160	77	45,725	10	73	2	27	131	0	0	510,613	253
Nebraska	3	0	0	0	3	0	1	2	0	0	7,277	12
Missouri, Iowa	0	0	0	0	0	0	0	0	0	0	0	4
Oklahoma	108	50	16,035	7	51	3	31	56	18	0	387,825	201
North Texas	36	11	7,961	0	25	1	16	13	6	0	119,507	72
West Central Texas	32	12	1,347	0	20	3	8	21	0	0	85,873	38
Northern West Texas	33	29	16,645	0	4	0	2	12	19	0	160,673	49
Southern West Texas	45	36	41,055	0	9	1	7	28	9	0	165,287	54
Texas Panhandle	24	19	3,709	4	1	0	1	23	0	0	70,674	28
East Texas	32	17	3,101	3	12	2	0	21	9	0	139,515	29
Upper Gulf Coast	43	24	4,190	2	17	0	1	4	35	3	300,174	86
Lower Gulf Coast	32	15	1,598	3	14	0	0	7	25	0	201,600	44
South Central Texas	6	1	25	0	5	1	3	1	1	0	15,204	15
South Texas	19	3	194	1	15	0	2	9	8	0	88,160	22
Southeast New Mexico	17	14	1,420	1	2	0	2	15	0	0	60,762	72
Arkansas	18	12	1,850	0	6	1	1	6	10	0	101,888	39
North Louisiana	39	31	6,834	0	8	0	7	7	25	0	189,526	61
Louisiana Gulf	45	24	5,352	2	19	0	1	5	22	17	324,945	94
Mississippi	2	1	325	0	1	0	0	2	0	0	8,930	18
Alabama	1	0	0	0	1	0	0	1	0	1	3,327	2
Montana	33	20	1,907	11	2	1	20	12	0	0	65,907	78
Wyoming	15	15	4,883	0	0	1	2	11	1	0	49,341	68
Colorado, Utah	5	2	390	1	2	0	3	2	0	0	13,721	27
Northwest New Mexico	1	0	0	0	1	0	0	0	1	0	6,950	12
California	64	36	10,354	3	25	4	23	15	22	0	249,965	84
Florida	0	0	0	0	0	0	0	0	0	0	0	4
Total July	1,578	833	197,613	224	521	74	577	665	232	20	5,065,773	2,384
Total June	1,309	726	195,036	157	426	62	445	552	230	20	4,089,943	2,386
Difference	268	107	2,577	67	95	12	132	113	12	0	975,830	2



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NORTH LOUISIANA. ARKANSAS

Two La Salle Parish Wildcats Testing Oil Shows in Wilcox

SHREVEPORT, La.—The main interest in North Louisiana was centered on La Salle Parish, where two wildcats were in the process of testing showings logged in the middle Wilcox sand. Both wells were drilled jointly by the Carter Oil Co. and Phillips Petroleum Co. and are located 12 and 16 miles south of the town of Jena. The companies' 2-C State-Catahoula Lake, in 6-6n-4e, is bottomed at 4,802 ft. and a test was being made through casing perforations at 4,090-94 ft. South of this well about 4 miles in 25-6n-4e, 2-A Delta Land Co. was drilled to a total depth of 5,976 ft. and was preparing to retest after recovering salt water with a show of oil at 4,778-32 ft.

Carter Oil Co. 1 Lena E. Orr, a wildcat located in 3-16s-28w, Miller County, Arkansas, was preparing to core ahead, following a 9-minute drill-stem test at 7,347-99 ft. which recovered 660 ft. of drilling fluid cut with gas. Working pressure built up to 35 lb. The showing is believed to be from the Buckner lime.

NORTH LOUISIANA COMPLETIONS

Wildcat, Bossier Parish, 7 mi. W of Cotton Valley: Continental 1 Crystal Oil, SW NE SE 21-21-11w, dry, T.D. 5,660 ft., Midway 1,050 ft., Nacatoch 1,737 ft., Saratoga 2,111 ft., Glen Rose 4,050 ft., massive anhydrite 4,799-5,041 ft.

Wildcat, Caddo Parish, 7 mi. S of Shreveport pool: Gus K. Primos 1 Gerdes, SE SW SW 4-14-16w, dry, T.D. 1,602 ft.

Haynesville, Claiborne Parish: White & Hinton 1 Louisiana, SW NE 17-23-8w, flowed 145 bbl. in 8 hr., Smackover, perf. 5,370-82 ft., 5,400-12 ft., T.D. 5,456 ft.

Little Creek, La Salle Parish: O'Meara Bros. 3 Tremont, NE SW 24-9-1, flowed 370 bbl., T.D. 2,510 ft., Wilcox 1,590 ft.

Nebo, La Salle Parish: H. L. Hunt F-113 Goodpine, SE SW 22-7-3, flowed 165 bbl., perf. 3,328-35 ft., T.D. 4,034 ft.

Shongaloo, Webster Parish: Approximately C NW 4-22-9w, dry, T.D. 5,780 ft., anhydrite stringer 4,180 ft., James 5,110 ft., Pettit 5,610-20 ft.

Shreveport, Bossier Parish: W. C. Leisk 1 Free State, SW SE SW 19-18-13w, flowed 80 bbl., pay 5,558 ft., T.D. 5,568 ft.

Sligo, Bossier Parish: Triangle Drlg. 2-B Murff, SE NE 19-17-11w, dry, T.D. 3,180 ft.

Triangle Drlg. 1-B Murff, SW NE 19-17-11w, pumped 37 bbl., acidized in porous limestone, 3,154-58 ft., T.D. 3,172 ft.

ARKANSAS COMPLETIONS

Wildcat, Little River County, 1½ mi. SW of Alleene: J. G. Strahan 1 Sykes, SW NW NE 36-11-31w, dry, T.D. 1,296 ft., Tokio 322 ft., Fredericksburg 797 ft., Paluxy 890 ft., fresh water 1,176 ft.

Wildcat, Miller County, 3 mi. N and W of Texarkana pool: Tide Water et al 1 Luther Sutton, NE NW SW 2-15-26w, dry, 6,685 ft., Travis Peak 4,270 ft., Cotton Valley 5,150 ft., Buckner 6,370 ft., Smackover 6,590 ft.

Dorcheat, Columbia County: C. F. & M. Prod. Co. 1 Keith, SW NW 16-18-22w, old T.D. 8,913 ft., P.B. 7,925 ft., perf. 7,902-7 ft., flowed estimated 200 bbl., 41 gravity.

Macedonia, Columbia County: Atlantic 1 Brewer-Warnock, C S½ SW 15-18-21w, flowed 129 bbl. distillate, T.D. 8,898 ft., perf. 8,846-58 ft. in Cotton Valley, tested 2,720,000 cu. ft. gas and 132 bbl. distillate with 30 per cent water, squeezed and perf. 8,850-66 ft. in Smackover.

Stephens, Columbia County: G. H. Vaughn 1 Murphy, NW NE SE 14-15-20w, dry, T.D. 3,705 ft., perf.

(Continued on Page 107)

Texas Gulf Coast

(Continued from Page 91)

Frio 4,120 ft., dry, T.D. 6,041 ft.

Jackson County: Navarro 1 Koopman, dry, T.D. 6,516 ft.

Fields

Mayo, Jackson County: Tide Water 1-B Ratliff, 103 bbl., ⅛-in. choke, perf. casing 5,420-26 ft., T.D. 5,600 ft.

Sealy, Austin County: Shell 1 Hinz, 80 bbl. distillate, ⅛-in. choke, perf. casing 8,700-24 ft., T.D. 11,503 ft.

Stowell, Jefferson County: Glenn McCarthy 1 Plant-Sinclair, 146 bbl., ⅛-in. choke, perf. casing 8,736-38 ft., T.D. 9,501 ft.

Withers, Wharton County: Texas 115-C Pierce, 92 bbl., ⅛-in. choke, perf. casing 5,322-32 ft., T.D. 5,345 ft.

CANADIAN FIELDS

Production Indicated on East Flank of North Turner Valley

By VICTOR LAURISTON

CHATHAM, Ont.—Crude and natural-gasoline production from all Alberta fields for the week ending August 10 averaged 27,547 bbl. daily compared with 27,109 bbl. daily for the previous week and 27,774 bbl. daily for the corresponding week last year. The daily average included 26,611 bbl. of crude and 592 bbl. of natural gasoline from Turner Valley and 344 bbl. of crude from outside fields.

East Flank Prospects

In North Turner Valley, Northend Petroleum 1, LSD 12, 9-21-3w5, has the Home sand, in the lower Blairmore, at 7,840 ft. As this marker is only a little above the Madison limestone, prospects for a producing well are encouraging. Immediately to the north, Northend 2, LSD 13, 9-21-3w5, is in upper Blairmore below 5,846 ft.

It was formerly believed that Alberta Oil Incomes 1 and Major Oil 1, located on the crest of the Turner Valley limestone uplift, marked the eastern edge of the producing area in North Turner Valley. Recently, Major 9, east of the structural crest, finished a good producer, and indications are growing that a considerable area of limestone production will be opened on the east flank.

Home Development Program

Home Oil 10, LSD 15, 33-20-3w5, finished at 7,774 ft. with Madison lime at 7,147 ft., is testing, making around 900 bbl. daily after acidizing with only 2,000 gal. The gas-oil ratio is low, and allowable may be stepped up from 571 to around 700 bbl. Home Oil Co. is planning to drill out the northeast corner of this section, having derrick up for No. 13 in LSD 9 and drilling permit for No. 14 in LSD 16.

British Dominion Deal

A United States group headed by John Conroy, S. C. Clark, Harry M. Prayle and C. Lowell Pfiefer, in conjunction with eastern Canada interests, having acquired control of British Dominion Oil & Development Co. This company, active in Turner Valley devolpment since about 1925, has acquired 100 per cent interest in 680 acres in North Turner Valley on which are located Atlas-British Dominion 2 producer and 3, drilling below 6,040 ft. Acreage is subject to royalties aggregating 20 per cent to the Alberta government and Home Oil. Dr. J. O. G. Sanderson, consulting geologist, will locate seven drill sites on this acreage, and work will be started this season on two new wells to be known as British Dominion 3 and 4.

Taber Field

In the Taber field, southern Alberta, Standard of B. C.-C.P.R., LSD 12, 17-9-16w4, has spudded and is below 275 ft. Standard-Province 1, LSD 9, 18-9-16w4, producing from 3,174 ft., has installed pump and will be placed in steady production with a potential around 300 bbl. daily. Clancey-Hi Test Petroleums 1, LSD 7, 24-9-17w4, is below 703 ft. after cementing surface casing around 190 ft. Frank and George McMahon, representing British Columbia interests, have secured extensive acreage south of Taber, extending almost to Chin Lake, and are arranging for a test. Spacing of wells in the Taber field will be on the 40-acre basis established elsewhere in Alberta except in the Vermilion field.

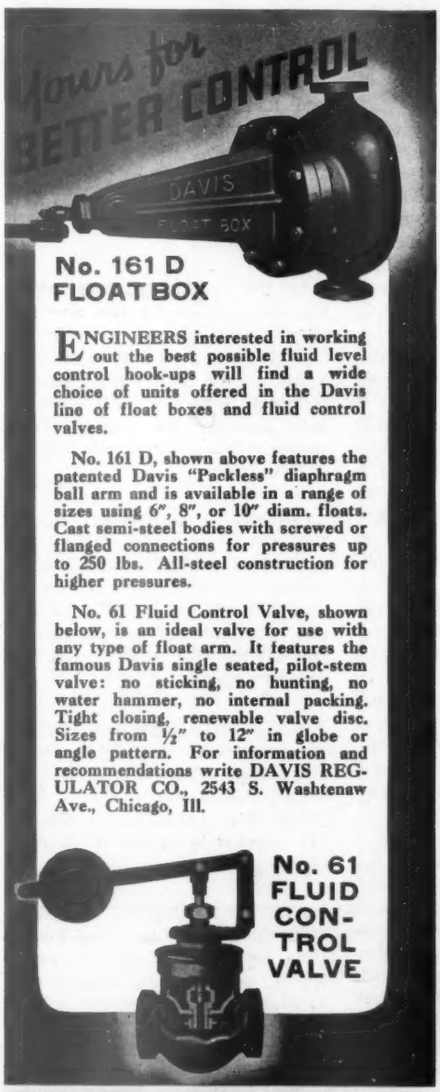
Casing Salvage Planned

Keen demand for well casing is likely to result in the definite pulling and plugging of numerous Alberta wildcat tests standing idle for many years but never formerly abandoned. J. W. Hamilton, of Edmonton, superintendent of mining lands for Alberta, has asked tenders for the "proper abandonment" of a number of such wells, the contractor to be reimbursed by a definite percentage of salvaged casing. The list of wells includes Raven Oils 1, LSD 1, 20-9-2w5, on the Watson structure; Devenish Oils 3 and 5, LSD 4, 27-5-14w4, in the old Skiff field; Beaver Oils 1, LSD 8, 24-2-11w4; Madison Oils 1, LSD 10, 24-2-11w4; Mayland Southern 1, LSD 13, 4-1-9w4; and Twin Butte-Northwest 1, 14-4-30w4. Most of the wells are in the border areas of southern Alberta.

Vermilion Field

In the Vermilion field, eastern Alberta, Vermilion Consolidated-O'Sullivan 1, LSD 3, 6-51-5w4, has drilled in, and is bailing crude in commercial quantities. The strike extends the productive area 1½ miles to the north. Serena 1, LSD 9, 25-50-6w4, a half mile west of the field,

(Continued on Page 108)



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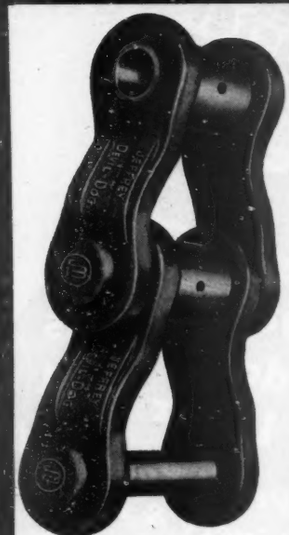

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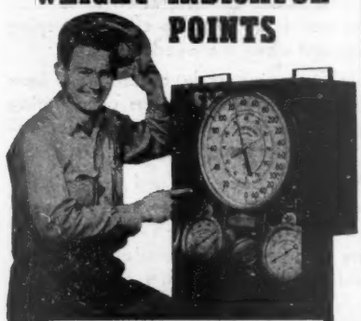

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Away back in 1934 the reputation of Martin-Decker Drilling Control Equipment was so good that it was recommended in text books on Petroleum Production Engineering.

See pages 220-221 in the book under this title by Lester Charles Uren, Professor of Petroleum Engineering at the University of California. What more need we say?

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Among the Drilling

M. J. DELANEY, Dallas, Tex., has the contract for Sinclair Prairie 1 Swinney, Lockhart Survey, 2 miles south of the Chapel Hill field in Smith County, Texas, which had reached 7,681 ft. in anhydrite.

E. G. BRADHAM, El Dorado, Ark., has drilling contract on P. D. Bowlen et al 1 Simms, on an 80-acre unit of a 1,120-acre tract in the H. C. Williams Survey, a mile east of Simms, in Bowie County, East Texas. Contractor was moving in for a 9,500-ft. test.

HELMERICH & PAYNE, Inc., drilling R. Olsen et al 1 Justis, in C SE SE of 11-25s-37e, a proposed 8,500-ft. test on the east flank of the Langlie area, Lea County, New Mexico, was drilling below 1,900 ft.

PAUL NAGLE has the drilling contract to drill an 1,800-ft. test for A. E. Pearson and Hugh Tyson of Oklahoma City, Okla., for their 1 Billips, in SW NE NW of 1-4s-17w, south of Frederick, near Red River, in Oklahoma.

OSAGE Drilling Co. is reported to have been awarded the contract for Shell 1 Leaverton, in Gaines County, Texas. Rig was being built, roads laid, and materials being moved in for the 7,500-ft. test, which is 660 ft. from the south and west lines of Section 458, Block G, C.C.S.D.&R.G. N.G. Survey. The location lies between the Wasson pool to the northwest and the Lee County, New Mexico, line.

J. I. ROBERTS Drilling Co. has been awarded contract to drill Phillips Petroleum Co. 1-C Tensas Delta in NE NW of 28-6n-4e, a 5,500-ft. well in La Salle Parish, northern Louisiana.

FAIN Drilling Co., Houston, Tex., has spudded in on another operation in the South Caesar field, Bee County, Texas, for Continental Oil Co. The location is northeast of the company's 1 Fox, recently completed to extend production to the southeast.

PETROLEUM WELL Service Co., Houston, Tex., which has three rotaries running in the Stewart field, Jackson County, Texas, for W. Stewart Boyle, extended production to the southwest and northeast with the completion of 1 Copsey and 1 Meyer. In the meantime, 1 Pagel, on the extreme west side of the field, was slated to be drilled deeper after no shows were logged in the 4,900-ft. pay.

JACK FRAZIER, Houston, Tex., received contract for Hebert & Smith 1 A. C. Hutchinson, a wildcat located in the Mount Houston area, Harris County, Texas. The contractor's 2 Wood, a deep test in the Dyersdale field, Harris County, was being retested after a production test recovered salt water.

ROWAN Drilling Co., Houston, Tex., encountered high gas pressure in 1 Deaton, a semiwildcat located southeast of the Fannett field, Jefferson County, Texas. The well is being drilled jointly with Hebert & Smith and is scheduled to be drilled deeper from its present depth of 8,800 ft.

BREWSTER-BARTLE Drilling Co., Houston, Tex., was preparing to core for the pay in G. W. Strake 1 Florence & Parker, a wildcat located in the Aldine area, Harris County, Texas. In the meantime, testing is still under way in the North Bay City area, Matagorda County, Texas, where Ohio 1 McDonald looms as the discovery well of a new field.

PENROD Drilling Co., Dallas, Tex., has the contract for H. L. Hunt F-117 Good Pine Lumber Co., NE 7-7-4, La Salle Parish, Central Louisiana, a 5,000-ft. Wilcox sand wildcat. Penrod also has the contract for Cotton Valley Operators Committee 1 Grant Oil, in SE 12-21n-10w, a Bodcaw sand test at Cotton Valley, Webster Parish, Louisiana.

An Abilene, Texas, operator has partially solved his drilling problems arising from loss of crew men to the armed services by himself acting as driller on occasion. At present E. M. Hughes of Abilene is also a driller on Mr. Duffy's semiwildcat in southwestern Concho County, Texas, and C. A. Tisdale and Everett McGuffin of Eden, Tex., are tool dressers.

MANNING & MARTIN, drilling firm, is reported to have been awarded contract by Continental Oil Co. to drill a test 10 miles east of Provo, S. D., to a depth of 2,900 ft.

SUMMIT Drilling Co. was moving in rig material from the East Orlando pool in Payne County, Oklahoma, to the site of Gardner Petroleum Co. 1 J. W. Lowe, in NE cor. 31-19-1e, Payne County, Oklahoma, which was destined to be a Wilcox sand test to 5,000 ft.

HOUSTON Drilling Co., Houston, Tex., completed Tide Water 1 Ratliff as a producer in the Mayo field, and has another rig running in the Harmon field for Gulfboard Oil Co. Both operations are in Jackson County, Texas.

M. R. SLATSBURG, Kilgore, Tex., is contractor and has moved in rig for starting I. N. Buchanan and Roy Lester 1 Mary Ellis, Matthews Survey, a projected 5,800-ft. Paluxy sand test 1 mile north of Cason in Morris County, Texas.

DELTA Drilling Co., Dallas, Tex., has the contract for two new Sinclair Prairie Oil Co. wells in the Chapel Hill field, Smith County, Texas. They are the 2 O'Neal, McDonald Survey, which has set surface pipe, and the 1 Smith, Hyde Survey, which has set conductor pipe at 50 ft.

CROSSE & JOHNSON, Odessa, Tex., are contractors for Mascho Oil Co. 1 Mrs. A. C. Means, scheduled 4,600-ft. wildcat in north central Andrews County, Texas, NW SE Section 23, Block A-36, P.S.L. Survey, and has spudded 30 ft. in red rock and were rigging up rotary.

GUY SITTON, Corsicana, Tex., has the contract for a 1,700-ft. test 3 miles west of Kerens in Navarro County, Texas, for a Dallas, Tex., partnership, Lancaster & Gamble. The location is on the W. S. Price farm.

BAXTER Drilling Co., O. J. Wamhoff, Ellsworth, Kans., and Forrest Cave, Salina, Kans., operators, were drilling below surface pipe at their Antelope County, Nebraska, wildcat.

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Efficient—Economical More than 45,000 sold

Fig. 7002 Fig. 7001

MADE WITH 1 OR 2 U-BOLTS

In Stock for Immediate Shipment

BROWN & BROWN, Incorporated

LIMA, OHIO, U. S. A.

Contractors

It is designated as their 1 Taylor, located in NE SW 31-25n-6w. It will be drilled to the pre-Cambrian granite. The well is being drilled on a 35,000-acre block assembled by Cave & Wamhoff.

GENERAL Geophysical Co. is the drilling contractor for Ohio Oil Co. 1 B. Frericks, C NE SW 6-4n-14e, in Nemaha County, Nebraska, 3 miles south and 3 miles west of Auburn. This was begun as a slim-hole stratigraphic test, but now is rated as a regular deep test.

OLSON Drilling Co., Tulsa, holds the drilling contract on Sunray Oil Co. 1 Welch, C NW SE 7-16-2w, on the northwest edge of the Guthrie townsite in Logan County, Oklahoma. The discovery well filled 350 ft. with oil and 400 ft. with oil-cut mud, but no water on a drill-stem test from 5,603 to 5,614 ft. in the Simpson dolomite. Crews were conditioning the hole to drill ahead.

CLAUDE BAGLEY, Shreveport, La., has the contract to drill Bering Oil Co. 1 Hardle, which was spudding in NE 34-22n-16w, Caddo Parish, Louisiana.

W. SPENCER COOK has the contract to drill Fortney & Broughton and W. Spencer Cook 1 Sawyer, in NE SE SW 24-3n-4w, Allegan County, Michigan.

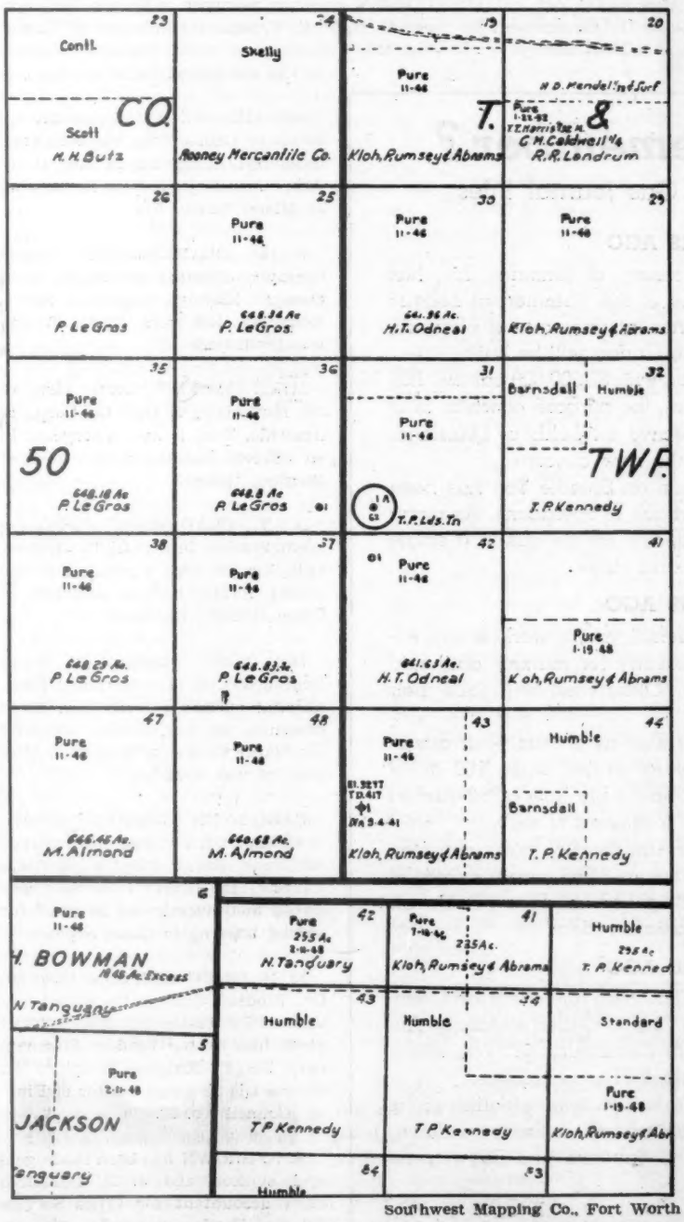
CLYDE PULSE is drilling contractor for J. E. Palensky et al 1 Arnold, in C SE SE 26-3n-16e, northeast flank of the Barada pool, Richardson County, Nebraska. Hunton lime was reached at 2,512 ft. for a show of oil, deepened to 2,529 ft. where it had water; now trying to shut off.

IRA DONLEY, of Mount Morris, Pa., was the drilling contractor on a well owned by Houze Glass Co., which came in for a 3,500,000-cu. ft. strike on the Ellsworth Donham estate, near Greensboro, in Greene County, Pennsylvania. The strike was made in the Big Injun sand, at a depth of 1,547 ft.

LEE Drilling Co. has contract to drill a 7,500-ft. well in C SE SE 26-1s-5w, Stephens County, Oklahoma, an offset to the 1-D Selby which made a big producer at 7,100-64 ft. The well is Skelly Oil et al 2-D Selby.

JOHN MORAN, Wichita Falls, Tex., was the contractor for Walter K. and Roy Dale Jones, of Oklahoma City, Okla., on their wildcat, 1 Gus Darnell, in Section 173, T.&P. Survey, 3½ miles northeast of Peaster, in Parker County, Texas. The wildcat was drilled to 6,126 ft. to get the Ellenburger dry, plugged back to 5,637 ft., where pipe was set. When plug was drilled the gas blew tool up the hole about 700 ft. There was considerable oil showing. Operators killed the flow to recement. Continental Oil and Sunray Oil supported the test.

JOHN M. BURTON has contract to drill P. S. Anheuser 1 Tripp, NE SW SE 19-1n-13w, Allegan County, Michigan.



Southwest Mapping Co., Fort Worth

The Chancellor pool in the western corner of Pecos County is one of the new producing areas in West Texas. Production is obtained from the Delaware sand and lower Castile. Pure Oil Co. 1-A T. P. Land Trust discovered the pool in the Delaware sand and its offset, Pure 1 Legros, opened the second zone. The third well shown is still drilling

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Personal Paragraphs

REX STAPLIN, Mattoon, Ill., scout for Cities Service Oil Co., is being transferred to the Wichita, Kans., office, to be in the land department. Mr. Staplin has been in the Illinois area for the past 4 years. He will be replaced in Illinois by SHERRIL WILLIAMS, transferred from the Mount Pleasant, Mich., office, where he has been scout for the past year. BILL QUIGLY is being sent up from Bartlesville, Okla., to replace Mr. Williams in Michigan.

J. G. RYAN, of the research laboratories of Shell Oil Co., Inc., is on leave of absence to serve with an armored field artillery unit of the Army.

LEE MULVIHILL, executive secretary of the Illinois-Indiana Petroleum Association, Robinson, Ill., has returned from a vacation spent at Carlsbad, N. M.

GLENN WALLACE, formerly with I. T. I. O. in the Amarillo, Tex., office as geologist and scout, is now in charge of a geophysic crew for Cities Service Oil Co.

L. T. FRANKS, pumper at the refinery of Lion Oil Refining Co., El Dorado, Ark., has been presented with a handsome watch for working 15 years without a lost-time accident.

HOWARD S. BRYANT, executive vice president of Hollow Drilling Co., Wichita, Kans., and who until recently was geologist for Skelly Oil Co., was a Tulsa visitor over the week end.

JAMES F. McMANMON, executive staff member of Hanlon-Buchanan, Inc., Tulsa, who has joined the U. S. Army, will report for duty at Dayton, Ohio, August 31, as technical executive engineering officer.

CLAREL MAPES, secretary of the Mid-Continent Oil and Gas Association, Tulsa, who spent several days at his office last week, has returned to Washington, D. C., to assist officials of the industry who are appearing before Senate committees.

JAMES JESTER is the new president of the Doherty Men's Fraternity at Bartlesville, Okla., composed of employes of Cities Service Oil Co. and subsidiaries, succeeding J. GLEN UMBARGER, who is enrolling with the Seabees, a naval construction regiment.

WALTER RITTERBUSCH, manager of the land department of Kewanee Oil Co., Tulsa, has received a commission as major in the air service of the Army, and was scheduled to report to the commanding general in the Air Corps in Washington on August 23. In the other war, Major Ritterbusch trained as a pilot and was 1 day out at sea when the armistice caused the Government to halt the vessel and return it to this country.

Do You Remember?

From The Oil and Gas Journal Files

40 YEARS AGO

A proposition for an oil refinery at Jennings, La., has been accepted by the directors of the Commercial League of that city. Work will be started at once and a plant capable of running at least 700 bbl. a day will be built.

The Martin Development Co., with $5,000,000 capital, has been organized at Lafayette, La., the purpose of which is to thoroughly develop the prospective oil fields of Louisiana. Robert Martin is president of the new concern.

Recently the presence of gas on Spindle Top has been an annoying and painful drawback to operations. As many as 200 workmen have been affected by the gas in a single day. The gas attacks the eyes and lungs.

25 YEARS AGO

Many sturdy, energetic, efficient young workers are being withdrawn from the oil industry for military duty and their loss will be keenly felt. Older men will take their places.

At Warren, Pa., a well was shot as a county-fair attraction. About 9,000 spectators were thrilled when 100 qt. of nitroglycerin were touched off, and a big flow of oil gushed to the surface accompanied by fragments of rock.

While Germany and Austria are short of many supplies, they still seem to have sufficient oil. The recent retreat of Russian forces in eastern Galicia has made available an important oil field for the Teutonic invaders.

10 YEARS AGO

John B. Corrin, Pittsburgh, Pa., vice president and general manager of Hope Natural Gas Co., died suddenly August 27 in his room at a hotel in Clarksburg, W. Va., where he had gone to attend an outing of Hope employes.

Standard Oil Co. of New York, Inc., is considering plans for the establishment of a large modern refinery on Staten Island, across the Kills from the Bayonne and Bayway refinery area.

Shell Petroleum Corp. has virtually completed its $1,000,000 construction program at Houston which was started early this year and now all the new equipment is in operation.

STANLEY WHITE, a member of the Findlay, Ohio, geological staff of Ohio Oil Co., had the pleasure recently of a brief visit with his brother, Leslie J. White, whom he hadn't seen in 21 years. The visit came about when Leslie, who is with the British Merchant Navy, came to this country when his ship was brought here to be completed and loaded with supplies for overseas.

SAM BICKHAM, who left the Tulsa office of Carter Oil Co. several months ago to join the armed forces, and who received his naval training at San Diego and San Francisco, Calif., is en route to Chile, South America, where he will be attached to the diplomatic corps.

R. S. ORR, manager of the La Crosse, Wis., sales division of Standard Oil Co. of Indiana, will retire on annuity October 1. The retirement is on account of disability. Mr. Orr joined Standard in 1907. R. T. KINNEMAN, manager at Quincy, Ill., will succeed Mr. Orr at La Crosse, and H. M. DAWSON, assistant manager at Quincy, will succeed H. E. PURDY, assistant manager at Kansas City, Mo., who has been granted leave of absence to join the armed forces.

ROLAND BOND, independent operator of Dallas, Tex., has been commissioned a captain in the U. S. Army Air Corps and is in training at Miami Beach, Fla.

G. H. BLANKENSHIP, Illinois operator, attended graduation exercises at Missouri School of Mines, Rolla, Mo., last week, where his son was graduated.

MIKE SIMMONS, former clerk in the land office of Gulf Oil Corp., at Amarillo, Tex., is now a sergeant in an officers training school at Fort Benning, Georgia.

A. T. CLAIBORNE, purchasing agent, Sinclair Prairie Oil Co., Gainesville, Tex., is now a member of the armed forces, and is stationed at Camp Gruber, Oklahoma.

BOB ROSE, president of Macro Drilling Co., is in a Meridian, Miss., hospital suffering from high blood pressure. He was stricken while on his Clarke County wildcat soon after the test was spudded.

CARL LYNN STEPHENS, formerly of Shell Oil Co., Inc., has received his basic naval training at Great Lakes, Illinois, and is being transferred to University of Missouri for special training in diesel engines.

R. M. "RED" SIMPSON, Ohio Oil Co., Findlay, Ohio, is the proud possessor of a past commander's jewel given him by the Findlay Commandery No. 49, Knights Templar. Mr. Simpson is also past master of Findlay Council No. 50.

R. A. BROWN has been made general auditor, and J. H. COLLINS chief accountant for Cities Service Oil Co., Bartlesville, Okla. The appointments were announced by C. E. MURRAY, vice president and secretary of the company. Both men are veteran employes of the company.

B. M. JONES, of the Rowmor-Leonard companies, in Michian, is recuperating from an operation he recently underwent.

WALLY INGRAHAM, producer-driller in Michigan fields, will leave shortly for the Army.

SERGE RUBENSTEIN, chairman of the board, and HENRY W. WILSON, president, Panhandle Producing & Refining Co., were in Wichita Falls, Tex., last week for an inspection of the company's properties.

W. F. LOWE, secretary, Natural Gasoline Association of America, met this week with members of the high-pressure-gas technical committee in Houston, Tex., and members of the technical committee at Dallas.

H. O'HALLORAN, director of postal services at the G.P.O., has been appointed acting director of petroleum in the ministry of fuel and power, in London, England. SIR CECIL KISCH, the present director general, is undertaking a mission overseas at an early date.

PRESTON G. NORTHRUP, independent operator of San Antonio, Tex., has been commissioned a captain in the U. S. Army and assigned to Dodd Field, reception center at San Antonio. Captain Northrup served with the same rank in the Ninetieth Division during World War I.

MAX S. APP, general superintendent of production of General Petroleum Corp., with offices in Los Angeles, Calif., recently completed 30 years of service with the company with which he became affiliated as an instrument man in the survey for General Petroleum's San Joaquin-to-Wilmington pipe line in 1912.

DON LANGWORTHY, WENDELL HERSHEY TEEGARDEN and HOWARD M. MAHER, all of Gulf Oil Corp., Tulsa, will leave September 2 for Miami Beach, Fla., where they will report at the air forces training school for officers. Mr. Langworthy was in Gulf's executive department, and has been commissioned a first lieutenant. Mr. Teegarden was in the sales division, and has been commissioned a captain, while Mr. Maher was in the land department, and becomes a second lieutenant.

Diligent Researcher

Many of the industry's contributions to the country's war effort may be rightfully credited to Standard Oil Co. of New Jersey. In so far as these contributions involve new refining processes and procedures much of that credit is more specifically due to Robert Price Russell, executive vice president of Standard Oil Development Co., from which 100-octane gasoline, synthetic rubber and other processes vital to our war program have issued.

ROBERT PRICE RUSSELL

Mr. Russell has been a member of the Jersey organization's technical and research division for 15 years. In 1927 he left the faculty of Massachusetts Institute of Technology, Cambridge, to go to Baton Rouge, La., as manager of the development and research department of Standard Oil Co. of Louisiana. Mr. Russell had completed his scholastic training at M. I. T. in 1922 when he received his master of science degree there.

His preliminary training was received in the public schools of Worcester, Mass., where he was born July 16, 1898, and at Holden, Mass., where he attended high school. In 1917 Mr. Russell received a bachelor of arts degree from Clark University at Worcester, and in that and the following years served as an instructor at University of Michigan and Worcester Polytechnic Institute.

Following his graduation from M. I. T. in 1922, he spent 4 years as research assistant and divisional director of the institute's research laboratory of applied science. In 1926, the year before he went to Baton Rouge, Mr. Russell was made assistant director of the laboratory and assistant professor of chemical engineering.

After 3 years with Standard of Louisiana, Mr. Russell was transferred to Bayway as vice president and general manager of Hydro Engineering & Chemical Co., a Jersey subsidiary engaged in the development of the hydrogenation process. In 1932 he went with Standard Oil Development Co., with which he has been associated since. His first position with the company was that of manager of the development division. In 1934 he became vice president and general manager and in 1937 he was advanced to the position of executive vice president, the position which he now holds.

FRANK STARKS, formerly with the Robert W. Atha drilling organization in Michigan, is now serving with the Army as first lieutenant in the Quartermaster Corps, and is stationed at Baltimore, Md.

GEORGE L. GARDINER, superintendent of Shell Oil Co. of British Columbia's refinery at Shellburn, B. C., has taken on the added duties of British Columbia operations manager.

W. H. HARTS, vice president in charge of manufacture for Warren Petroleum Corp., Tulsa, is boasting of the big ones he caught while vacationing in the lake country of Minnesota. He returned Monday.

E. H. LYON, manager of the Wichita, Kans., branch of Phillips Petroleum Co., has been appointed general manager of the early contacts division of the Community War Chest campaign, which will be held November 9-18. Mr. Lyon headed this division last year.

J. W. ELLIS, independent operator of San Angelo, Tex., and his son, JOHN ELLIS, have left for a business trip to Billings, Mont., their former home. Young Mr. Ellis recently arrived in San Angelo from Waco, Tex., where he is near completion of his course at Baylor University.

W. W. ROBINSON, of Texas Co., and president of the California Natural Gasoline Association, will soon announce that the association's fall meeting to be held November 6, 1942, will be a half-day session instead of a full day as heretofore. The evening Hi-Jinx will probably be continued although in a reduced form.

HUGH PIERCE, drilling contractor, has joined up with Harper & Turner Oil Co., and will run his own and company's tools, and handle drilling and production for the company. The announcement follows the departure of JACK DUNCAN, former superintendent, to the Navy. W. F. SNOOTS, land man with Harper & Turner, has been commissioned a captain in the air service, and he is now in training at Miami Beach, Fla. C. R. WELCH, former land man for Shell Oil Co., Inc., has joined Harper & Turner as manager of the land department.

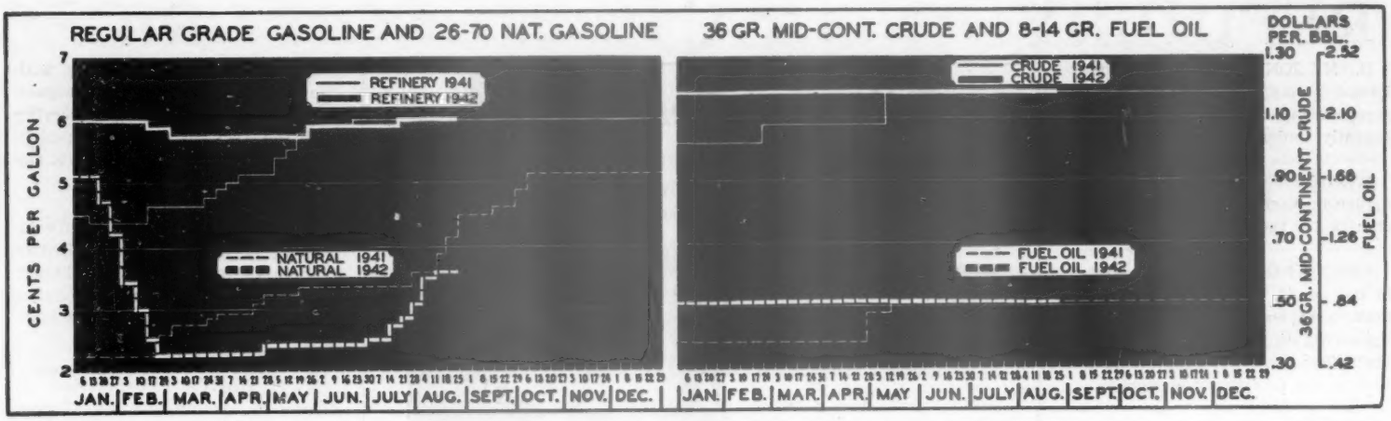
Capt. THEODORE SWENSON and naval aviation cadet HOWARD M. HUMPHREY, represented more than 1,100 Humble Oil & Refining Co. men in the nation's armed forces when they returned last week to share honors in raising the red and blue Army-Navy production-award flag which was presented to the company for "high achievement in the production of war equipment." Both men are former employes of the company's refinery at Baytown, Tex.

ODELL C. OLSON, former petroleum geologist, has returned to Brady, Tex., from an assignment with the War Department as associate engineer in a construction project at Trinidad, British West Indies, where he was stationed for 4 months.

Shifts: ROY F. BEERY, JR., engineer, Shell Oil Co., Inc., Freer to Premont, Tex.; SAM E. FORSYTH, engineer, Phillips Petroleum Co., Phillips, Tex., to Medicine Lodge, Kans.; S. A. BERWICK, superintendent, Phillips Petroleum Co., Eureka to Herington, Kans.; H. S. AUSTIN, engineer, Standard Oil Co. of New Jersey, Elizabeth, N. J., to Aruba, Netherlands West Indies; C. E. WRIGHT, British American Oil Producing Co., Tulsa, to Los Angeles, Calif.; DICK M. KOONS, engineer, Texas Co., Apache, Okla., to Garnett, Kans.

C. E. DAVIS, manager of the manufacturing department of Shell Oil Co., Inc., New York City, was the principal speaker at a service-award presentation dinner held in Houston, Tex., last week. Service emblems totaling 83 were presented by P. E. HURLEY, plant superintendent.

EDMOND C. BREENE, JR., petroleum geologist, will shortly return to South America to resume employment with International Petroleum Co. For the past 2 years Mr. Breene has been identified with Mohawk Drilling Co. in Mount Vernon, Ill. He is the son of EDMOND C. BREENE, well-known oil man of Oil City, Pa.



MARKET DEVELOPMENTS . . .

East Coast

NEW YORK.—The joint OPC, OPA and WPB study now directed at the District 1 fuel-oil rationing may result in earlier suggestions that this alternative would have to be adopted. Since District 1 includes a considerable area in which the use of fuel oil for heating purposes is negligible, it is improbable that the entire district will be included in any plan adopted. Rationing may be undertaken on a basis of average temperatures for the affected areas.

The alternative of reducing gasoline rations to permit the transportation of greater quantities of the badly needed heating oil apparently is being given little if any consideration. Since the value of gasoline ration coupons was increased from 3 gal. during the temporary period to 4 gal. in the permanent rationing scheme, consumers apparently feel that the need for conservation declined as the rations advanced. The belief is held that if the logical step of reducing "A" gasoline rations is adopted both fuel oil and gasoline consumers will have a better appreciation of the seriousness of the situation.

Treasury Department reports showing that imports from Venezuela and the Netherlands West Indies were down almost 70 per cent in the first 7 months of this year shed further light on the East Coast situation. Normally virtually all exports to the United States from the Caribbean area are consigned to East Coast ports. They amount to approximately 25 per cent of the normal East Coast oil receipts.

The effect of declining motor-car consumption is being reflected in lubricating oils. Neutrals, principal constituent of motor oils, have suffered a severe drop in demand with the result that lower quotations are reported in the Pennsylvania area.

Mid-Continent

THE impact of the OPC directive prohibiting the use of tank cars in delivering automotive fuel in the 20-state zone is certain to be significant in refinery markets as long as it is a requirement. However, refiners were unable to determine this week any tangible changes in actual conditions. Although the long-term result is expected to be a depressing factor on markets, the restrictive transportation order so far has appeared to whet the interest of buyers in arranging for supplies over an extended period.

Refiners resisted all additional contract obligations this week, pending a more accurate determination of how operations will shape up under terms of the directive.

Natural-gasoline manufacturers were skeptical that the vigor of their current and recent market could be maintained although their products, except stabilized grades suitable for direct motor consumption, were not included in the tank-car prohibition.

Manufacturers continued to quote 3.625 cents per gallon on 26-70 material in Oklahoma (Group 3) territory for northern and eastern delivery and North Texas producers offered the same material at 3.25 cents per gallon. The Oklahoma price was inadvertently reported at 3.375 cents in this column last week, instead of 3.625 cents.

Demand for fuel oil is increasing as the heating season in northern states draws nearer. Substantial percentages of fuel oil have been diverted from the Middle West market during the past 3 or 4 months to storage on the East Coast. Consequently, the supplies of burning oils in the interior refining district are not as abundant as physical operating conditions would otherwise indicate. Kerosene demand is brisk along with all distillate and residual grades of fuel.

SENTENCE SUMMARIES

MID-CONTINENT: Markets influenced by disturbance of transportation conditions. Prices steady.

EAST COAST: Question of fuel-oil rationing studied by federal board. Gasoline ration may be lowered.

PACIFIC COAST: Residual fuels and gas oils in strong position. Lubricants show market improvement. Other products steady.

PENNSYLVANIA: Neutral-oil prices slump. OPC prohibits tank-car shipment of gasoline into District 2.

GULF COAST: Slight improvement reported in demand and on low side of motor-fuel price range.

A.P.I. REFINERY REPORT

Week Ended August 15, 1942

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks: Gasoline	Residual	Gas oil
Appachian	164	2,830	546	556
Ind., Ill., Ky.	740	14,814	3,846	5,261
Okla., Kans., Mo.	365	6,725	1,315	1,662
Censored group*	1,670	38,589	17,714	20,143
Rockies	89	2,047	553	424
California	683	15,703	53,448	11,995
Total Aug. 15, 1942	3,711	80,708	77,422	40,041
Total Aug. 8, 1942	3,581	81,277	78,575	39,024
Total Aug. 16, 1941	3,990	82,312	93,365	45,368

Note: Refinery runs and stocks for week ended August 22, 1942, appear on Trends page.

*Reports combined on East Coast, Gulf Coast, Louisiana-Arkansas and Inland Texas at request of OPC.

CRUDE-OIL STOCKS

(Bureau of Mines estimate)

Week ended:	Bbl. of crude*
August 15, 1942	246,433,000
August 8, 1942	246,975,000
August 16, 1941	251,013,000

*Excludes heavy, unrefinable stocks in California.

Gulf Coast

HOUSTON, Tex.—The Gulf Coast refinery market continued to maintain its strong position this week as heavy demand developed for all products. The increase in buying is believed to be a result of the shortage of materials at inland refinery centers which have been depleted by the heavy movement to the East Coast and the RFC arrangement to pay abnormal transportation costs on oil shipments to seaboard. This probably accounts for the fact that a substantial gain in tank-car movement has been reported for the district during the past few weeks. However, numerous inquiries have not been bid on because of inability to assure delivery.

In reporting inventories of refined production as of August 15, the Gulf Coast Refinery Association reported a decline of approximately 35,000 bbl. of gasoline stocks, now listed at 2,665,690 bbl. Total stocks of all products were 5,866,979 bbl., a slight decrease since August 1. Crude runs to stills amounted to 1,409,300 bbl. or 93,953 bbl. per day which is 55.2 per cent of capacity.

Pacific Coast

LOS ANGELES, Calif.—The general market is moderately active at prevailing prices. There were no price changes during the week.

Gasoline: Demand is higher than expected but with a surplus of material the market is absorbing quantities offered at low prices. There is a tendency, however, for gasoline prices to stiffen.

There is practically no natural gasoline available in the spot market.

Continued substantial reductions in stocks reflects highest fuel-oil demand ever experienced and leads to some anxiety as to future ability to meet maximum demands. Unless some method is devised to stimulate production of heavy crude-oil refiners will not be able to meet requirements for fuel oil. Navy fuel-oil specifications are exacting and cannot be met with ordinary fuel oil.

Gas oil, although not moving in quantity in the spot market, is in good demand by refiners and marketers for blending with heavy fuel. There is no apparent shortage of gas oil at present time.

The lubricating-oil market is quiet but on firmer ground. Several major refiners are building facilities for production of improved aviation lubricating oil.

REFINERY AND TANK-WAGON PRICES

(Prices as of August 25)

Refinery Gasoline

Octane (A.S.T.M.):	†80	78	74-76	72-74	68-70	63-66	60 & low
Mid-Continent*				5.875-6.000		5.500-5.625	5.125-5.250
Pennsylvania			6.750-7.000				
Gulf Coast‡	6.00-6.50			§5.750-6.250	§5.750-6.250	§5.250-5.750	§5.000-5.500
Northeast Coast	9.80			9.2	9.2		
Pacific Coast		6.750-7.000	6.500-6.750	6.375-6.500	6.000-6.375	5.500-5.750	5.000-5.125

*Basis Group 3. †1939 C.F.R. (research method). ‡Integrated companies restricted to lowest prices. §Unleaded.

Quotations are f.o.b. plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

Natural Gasoline

Grades:	26-70	18-55	75-85(350-375)
Oklahoma (Group 3)	3.625	4.350	
North Texas	3.250	3.900	
North Louisiana	3.375	4.050	
California			5.000-5.500

Kerosene and No. 1 Fuel Oil

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*			4.625-4.750	4.500-4.625	
North Louisiana				4.500-4.750	
Pennsylvania	6.250-6.625	6.125-6.250			
California				4.500-5.500	4.250
Northeast Coast				6.80	
Gulf Coast				3.875	

*Basis Oklahoma Group 3.

Tractor, Diesel, and Bunker Fuel Oil

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Bunker C
Mid-Continent*	4.125					
California		2.750-4.000			‡$1.35-1.45	$0.85-0.90
Gulf Coast			4.000	4.125	1.45	0.85
Northeast Coast				6.800	2.780	1.65
North Louisiana						†0.80-0.85

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200.

Furnace Oil, Gas Oil, Fuel Oil

	No. 2	No. 3	No. 5	No. 6
Mid-Continent*	3.625-3.750	3.500-3.625	$0.85	$0.85
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	
Northeast Coast	6.7	6.7	1.95	1.65
Pacific Coast	5.5	5.5	‡0.80-95	§0.80
Gulf Coast	3.875-4.0		1.65	0.85

*Basis Oklahoma Group 3. †36-40 gravity fuel oil. ‡Pacific Specification 300. §Pacific Specification 400.

Lubricating Oils

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25	27.00
150-160 D, 0-10	23.00
120-125 D, 0-10	22.00
Steam refined:	
600 dark green (untreated)	9.00 9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):	
10 pour point	30.50
15 pour point	29.50
25 pour point	25.00 28.00
Steam refined:	
600	15.00 16.00
650	15.50 16.50
600 flash	16.00 17.50
630 flash	17.00 17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:

200-S	15.00
300-S	18.00
500-S	19.50
600-S	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oil

CALIFORNIA

Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:

Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00
200 vis., at 70° F., 3 color	
Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	32.00

Wax

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.850
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

EXPORT PRICES

Gasoline—60-62° Gravity, Maximum 400 End Point

Octane:	72-74	68-70	65-66	60
Gulf Coast	6.500	6.250-6.500	5.875	5.625
Pacific Coast		6.125-6.500	5.875-6.000	5.500-5.625

Distillate and Fuel Oil

	Kerosene	Diesel fuel			Bunker
	41-43	24 G.	48-52 D.I.	58 D.I. Bunkers	C grade
Gulf Coast	4.000-4.250	.....	4.125-4.375	4.375 $1.65-80	$0.85-95
Pacific Coast	4.750-5.000	1.25-30	.....	..... †1.35-45	*0.80-90

*Pacific Specification 400. †Pacific Specification 200.

Lubricating Oils

	Neutral oils		Bright and cylinder stocks		
	200-3	150-3	200-3	150-3	600&630 S.R.
Mid-Continent	16.8	.....	28.8	24.8	.....
Pennsylvania	43-50	41-46	36-37	36-37	26.5-27

GASOLINE AND KEROSENE TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades, tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Baltimore, Md.	15.45	5.50	10.20
Boston, Mass.	14.90	4.50	9.50
Burlington, Vt.	16.90	5.50	
Buffalo, N. Y.	16.20	5.50	10.30
Dover, Del.	16.70	5.50	11.20
Hartford, Conn.	15.60	4.50	
Manchester, N. H.	17.30	5.50	10.50
Newark, N. J.	14.70	4.50	9.40
New York, N. Y.	16.10	5.50	9.50
Philadelphia, Pa.	16.20	5.50	11.65
Pittsburgh, Pa.	16.70	5.50	12.00
Portland, Me.	16.30	5.50	9.60
Providence, R. I.	15.00	4.50	9.30
Washington, D. C.	14.70	3.50	10.70
Average 14 cities	15.91	5.07	10.32

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Chicago, Ill.	13.40	4.50	10.30
Cleveland, Ohio	15.00	5.50	*9.00
Dallas, Tex.	13.00	5.50	7.00
Des Moines, Iowa	14.40	4.50	9.80
Detroit, Mich.	14.40	4.50	9.60
Fargo, N. D.	16.90	5.50	11.30
Huron, S. D.	16.30	5.50	10.70
Indianapolis, Ind.	15.20	5.50	9.80
Little Rock, Ark.	17.50	8.00	10.00
Milwaukee, Wis.	16.10	5.50	10.50
Minneapolis, Minn.	15.40	5.50	10.30
Omaha, Neb.	15.40	6.50	9.80
Tulsa, Okla.	16.50	7.00	8.50
Wichita, Kans.	12.70	4.50	8.00
Average 14 cities	15.15	5.57	9.61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	21.40	7.50	11.40
Birmingham, Ala.	18.50	8.50	9.00
Charleston, S. C.	18.45	7.50	.....
Charleston, W. Va.	18.75	7.50	13.00
Charlotte, N. C.	19.60	7.50	11.00
Jacksonville, Fla.	21.40	8.50	10.40
Jackson, Miss.	17.50	7.50	8.50
Louisville, Ky.	16.50	6.50	8.50
Memphis, Tenn.	18.60	8.50	10.50
New Orleans, La.	16.75	8.50	*10.00
Norfolk, Va.	16.95	6.50	13.50
Average 11 cities	18.58	7.59	10.58

*Includes 1-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Albuquerque, N. M.	17.50	7.50	10.00
Boise, Idaho	20.10	6.50	16.50
Casper, Wyo.	17.00	5.50	12.00
Denver, Colo.	14.50	5.50	11.00
Helena, Mont.	17.00	6.50	13.00
Phoenix, Ariz.	18.50	6.50	12.50
Reno, Nev.	17.50	5.50	13.50
Salt Lake, Utah	18.56	6.50	14.50
Average 8 cities	17.58	6.25	12.88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13.50
San Francisco, Calif.	14.50	4.50	11.50
Seattle, Wash.	17.00	6.50	13.50
Average 3 cities	16.17	5.83	12.83
Average 50 cities	16.57	5.96	10.76
Average last week	16.57	5.96	10.76

La-Arkansas Fields

(Continued from Page 100)

3,465-3,329 ft., 3,465-79 ft., 3,398-3,418 ft., 3,312-29 ft., water.

MISSISSIPPI

Macro Drilling Co. 1 Long-Bell Lumber Co., located in 10-2n-16e, Clark County, loomed as the discovery well of a new field after saturated sand was cored in the Eutaw. Selman chalk was topped at 2,605 ft., Eutaw at 3,670 ft., and sand at 3,684 ft. A core from 3,677-87 ft., recovered 2 ft. of sand saturated with heavy dark oil.

In Sharkey County, West Central Mississippi, British American Oil Producing Co. opened the Gary pool when its 2 Houston heirs, SW NW NW 23-11n-7w, flowed 300 bbl. of 25-gravity oil in 3 hours and was shut in for additional tankage. Top of chalk was 3,260 ft., with pay at 3,263-65 ft. The 1 Houston also hit chalk pay but had to be killed because of water. The pool is close to both rail and barge terminals for handling the oil.

Gowanda, N. Y., Rationed

The town of Gowanda, N. Y., which lies across the gasoline rationing boundary that became effective in western New York August 22, was placed inside the rationed area by the amendment (No. 8) to the gasoline rationing regulations issued August 22 by the Office of Price Administration.

CRUDE-OIL PRICES

Representative selected crude prices from all sections of the country appear below:

East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Smackover, Arkansas, heavy	.83
Illinois basin	1.37
Pecos County, Texas	.95
Lance Creek, Wyoming	1.12
Bradford, Pennsylvania	3.00

Gravity Schedules

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast, Texas	West Texas*
18-18.9	$0.80	.....	.....	.....
19-19.9	.84	.....	$1.06	$0.70
20-20.9	.88	$0.85	1.08	.72
21-21.9	.92	.87	1.10	.74
22-22.9	.96	.89	1.12	.76
23-23.9	1.00	.91	1.14	.78
24-24.9	1.03	.93	1.16	.80
25-25.9	1.07	.95	1.18	.82
26-26.9	1.11	.97	1.20	.84
27-27.9	1.15	.99	1.22	.86
28-28.9	1.18	1.01	1.24	.88
29-29.9	1.20	1.03	1.26	.90
30-30.9	1.23	1.05	1.28	.92
31-31.9	.....	1.07	1.30	.94
32-32.9	.....	1.09	1.32	.96
33-33.9	.....	1.11	1.34	.98
34-34.9	.....	1.13	1.36	1.00
35-35.9	.....	1.15	1.38	1.02
36-36.9	.....	1.17	1.40	1.04
37-37.9	.....	1.19	1.42	1.06
38-38.9	.....	1.21	1.44	1.08
39-39.9	.....	1.23	1.46	1.10
40 and above	.....	1.25	1.48	1.12

*Includes Lea County, New Mexico.

Northern West Texas

(Continued from Page 97)

NORTHERN WEST TEXAS COMPLETIONS

Wildcats

Andrews County: Seimonelt Drilling (formerly Henry A. Roach) 1 University, SE NE Sec. 101, Blk. 10, Univ Sur., 1½ mi. SW of West Fuhrman field, elev. 3,218 ft., pumped 201 bbl. after shot, anhydrite 1,770 ft., Yates sand 2,930 ft., Yates frosted grains 2,970 ft., brown lime 3,970 ft., pay 4,534 ft., T.D. 4,580 ft., *extends West Fuhrman pool.*

Fields

Cedar Lake, Gaines County: George P. Livermore 2 White, SE SE Sec. 4, Blk. H, D.&W. Sur., elev. 3,063 ft., swabbed 314 bbl. after shot, pay 4,660 ft., T.D. 4,748 ft.

Dodge-Denman, Howard County: Ennisbrook Oil 24 Texas Land & Mtg., NW SW Sec. 4, Blk. 30, Twp. 1s, T.&P. Sur., elev. 2,340 ft., flowed 592 bbl. through casing after acid and shot, pay 2,678 ft., T.D. 2,801 ft.

Emma, Andrews County: Sinclair Prairie 16 Cowden, SW SE Sec. 1, Blk. 44, Twp. 1n, T.&P. Sur., elev. 3,154 ft., flowed 1,144 bbl. through tubing after acid, pay 4,170 ft., T.D. 4,260 ft.

Fullerton, Andrews County: Magnolia 2-11-37 Ralph, NW SE Sec. 11, Blk. A-32, P.S.L. Sur., elev. 3,369 ft., flowed 138 bbl. through ½-in. tubing choke after acid, anhydrite 1,635 ft., Yates 2,990 ft., pay 6,845 ft., T.D. 7,280 ft.

Ownby, Yoakum County: Drilling & Exploration 1-A M. F. Lackey, SW NW Sec. 501, Blk. D, J. H. Gibson Sur., elev. 3,553 ft., flowed 235 bbl. through ⅝-in. tubing choke after acid, brown lime 4,370 ft., solid lime 4,740 ft., pay 5,240 ft., T.D. 5,340 ft.

Sharon, Mitchell County: F. W. Merrick 2-A J. L. Strain, Sec. 64, Blk. 97, H.&T.C. Sur., elev. 2,163 ft., pumped 98 bbl. after shot, pay 1,540 ft., T.D. 1,690 ft.

Slaughter, Cochran County: Anderson-Prichard 2 Neal, old well, old T.D. 4,949 ft., T.D. 4,988 ft., flowed 8 bbl. an hour after acid.

Anderson-Prichard 9 Neal, old well, old T.D. 4,958 ft., T.D. 4,997 ft., flowed 12½ bbl. fluid an hour cut 10 per cent b.s. and w. after acid and shot.

Anderson-Prichard 13 Neal, old well, old T.D. 4,944 ft., T.D. 4,983 ft., swabbed 40 bbl. fluid in 8 hours, cut 7 per cent b.s. and w.

Continental 6-58 Dean, 1,953 ft. from N line and 669 ft. from E line of lease, Lge. 58, Martin C.S.L. Sur., elev. 3,693 ft., flowed 776 bbl. through tubing after acid, pay 4,930 ft., T.D. 4,972 ft.

Magnolia 14-C Mallett, elev. 3,648 ft., flowed 1,173 bbl. through 3-in. casing outlet after acid, pay 5,018 ft., T.D. 5,063 ft.

Slaughter, Hockley County: Devonian 4 Hudgens, 550 ft. from S line and 2,445 ft. from E line of lease, Sec. 8, Blk. X, P.S.L. Sur., elev. 3,549 ft., flowed 1,695 bbl. through casing after acid, pay 4,985 ft., T.D. 5,039 ft.

Honolulu 24-A Mallett, NW NW Lab. 8, Lge. 52, Scurry C.S.L. Sur., elev. 3,569 ft., flowed 217 bbl. through tubing after acid, pay 5,022 ft., T.D. 5,036 ft.

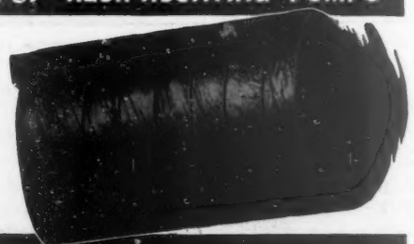
Slaughter, Terry County: George P. Livermore 5 Jacobson, SW NE Sec. 6, Blk. D-11, elev. 3,541 ft., flowed 1,289 bbl. through casing after acid, pay 4,996 ft., T.D. 5,043 ft.

Wasson, Gaines County: Continental and Carter 16-44 Langdon, SE SE Sec. 44, Blk. AX, P.S.L. Sur., elev. 3,539 ft., flowed 1,005 bbl. through tubing after acid, pay 4,860 ft., T.D. 5,010 ft.

Wasson, Yoakum County: American Liberty 7 Elliott, NE NE Sec. 769, Blk. D, Gibson Sur., elev. 3,642 ft., flowed 328 bbl. oil plus 5 per cent water, pay 5,077 ft., T.D. 5,182 ft.

American Liberty 10 Knight, NW NE Sec. 773, Gibson Sur., elev. 3,702 ft., flowed 354 bbl. oil plus 15 per cent water through tubing after acid, pay 4,976 ft., T.D. 5,282 ft.

For RECIPROCATING PUMPS



An outstanding packing for sealing gasoline and crude oil. Antifrictional twisted metal foil wrapper especially lubricated. High grade asbestos core. Supplied in spiral or die moulded rings.

WRITE FOR BULLETIN AND SPECIFICATION SHEETS

DURAMETALLIC CORPORATION

KALAMAZOO, MICHIGAN

Crane County Deep Wildcat Running Structurally Low

Geologists had some new and important subsurface information on the deep zones near the Abell area of Crane County last week. Magnolia Petroleum Co. 1 D. K. Glenn, Section 20, Block 1, H.& T.C. Survey, a deep wildcat in southwestern Crane County approximately halfway between the Abell Ordovician pool of northern Pecos County and the Sand Hills Ordovician sector in Crane County, was found to be running several hundred feet low structurally for the region.

Top of the Simpson section was called at 5,500 ft., and top of the McKee sand, a good marker, was picked at 6,125 ft. By comparison was the top of the Magnolia 1 Gerety, Section 23, Block 9, H.&G.N. Survey, a producer in the Abell field of Pecos County which had the same marked approximately 1,000 ft. higher. The two tests are only about 3 miles apart, and the Gerety is normal with other wells in the field.

Another interesting comparison was drawn with Continental Oil Co. 1 E. B. Jones, 1⅛ miles to the north, a far-south outpost to the Sand Hills Ordovician field. This well, a lone Simpson producer, went into the Simpson section at about the same depth as the Magnolia well, but it had only some 500 ft. of Simpson and the top part of the section was missing. The 1 Jones was completed in a lower sand at 5,725-50 ft. which, if identified as the McKee, would be some 400 ft. higher than the Magnolia well 1⅛ miles to the south.

Continental's well also was normal with the Sand Hills wells, particularly in that the top part of the Simpson is entirely gone on the Ordovician highs in this area and usually wedges out into the intervening lows.

Because of the geological importance attached to the 1 Glenn, Magnolia filed application to continue drilling to 7,700 ft. A Simpson section some 1,600 ft. thick was expected, which would place the Ordovician top at around 7,100 ft.

Two New Tests at Barnhart

Two new locations were announced for the Barnhart pool in southeastern Reagan County, a 9,000-ft. Ellenburger field. Amerada Petroleum Corp. staked 1-RH University, 679 ft. from the north line and 2,086 ft. from the east line, Section 7, Block 48 a south offset to the No. 1-RG. The same company staked 1-RI University, 684 ft. from the north line and 696 ft. from the west line of Section 7, ¼ mile west of the 1-RH.

SOUTHERN WEST TEXAS COMPLETIONS

Wildcats

Crockett County: Grapeland Oil 1 Clara Couch, NW NW Sec. 33, Blk. GG, H.E.&W.T. Sur., 2 mi. W of Clara Couch pool, elev. 2,727 ft., dry, T.D. 2,407 ft.

Fields

Byrd, Ward County: Stanolind 2 Byrd, 1,994 ft. from NW line and 1,980 ft. from NE line Sec. 34, Blk. 34, H.&T.C. Sur., elev. 2,579 ft., flowed 112 bbl. through ¼-in. tubing choke after shot, Yates 2,538 ft., pay 2,600 ft., T.D. 2,834 ft., P.B. 2,634 ft., *½-mile north of discovery.*

Clara Couch, Crockett County: Carpenter & Gibson (formerly Roger Harris) 1 W. D. Padgett, 660 ft. from NE and NW lines Sec. 17, S. G. White Sur., elev. 2,641 ft., pumped 223 bbl. after acid, pay 2,100 ft., T.D. 2,130 ft.

Estes, Ward County: Texas 4-C University, NE SE Sec. 5, Blk. 16, University Sur., elev. 2,607 ft., flowed 397 bbl. through 1-in. tubing choke after shot, pay 2,492 ft., T.D. 2,545 ft.

Goldsmith, Ector County: Landreth 1-D Blakeney, W½ NW Sec. 22, Twp. 1n., Blk. 44, T.&P. Sur., elev. 3,146 ft., flowed 132 bbl. through ¼-in. tubing choke after acid, pay 4,129 ft., T.D. 4,176 ft.

McElroy, Upton County: Gulf 272 McElroy, 2,253 ft. from N line and 1,707 ft. from E line Sec. 195, Blk. F, C.C.S.D.&R.G.N.G. Sur., elev. 2,698 ft., flowed 839 bbl. through casing after shot, pay 2,835 ft., T.D. 3,011 ft.

Gulf 44 McElroy, old well, old T.D. 2,859 ft., T.D. 2,975 ft., pumped 453 bbl. after shot.

Taylor Link, Pecos County: Addison Oil 1 University, elev. 2,539 ft., dry, T.D. 1,378 ft.

Walker, Pecos County: Cardinal Oil 1-C University, NE NE Sec. 25, Blk. 16, Univ. Sur., pumped 95 bbl. oil and 32 bbl. water, pay 2,078 ft., T.D. 2,103 ft., P.B. 2,090 ft.

Cardinal Oil 1-D University, SW NW Sec. 25, Blk. 16, Univ. Sur., elev. 2,700 ft., flowed 26 bbl. after shot, pay 1,735 ft., T.D. 1,750 ft.

Cardinal Oil 1I-J White & Baker, SW NE Sec. 4, Blk. 194, G.C.&S.F. Sur., elev. 3,065 ft., flowed 50 bbl. through tubing after shot, pay 2,165 ft., T.D. 2,175 ft.

Cooper & McDermott 2 White & Baker, SW SE Sec. 84, Blk. 194, G.C.&S.F. Sur., elev. 3,061 ft., flowed 78 bbl. through ⅛-in. tubing choke natural, pay 2,128 ft., T.D. 2,160 ft.

Weiner, Winkler County: Ralph Lowe 9 Brown & Altman, SE SW Sec. 24, Blk. B-5, P.S.L. Sur., elev., 2,821 ft., flowed 192 bbl. through casing after shot, anhydrite 750 ft., pay 3,087 ft., T.D. 3,176 ft.

TEXAS PANHANDLE COMPLETIONS

Carson County: Skelly 152 Schafer Ranch, Sec. 196, Blk. 3, I.&G.N. Sur., 470 bbl., shot 3,163-3,222 ft., T.D. 3,222 ft.

SOUTHEAST NEW MEXICO COMPLETIONS

Wildcat, Lea County: N. G. Penrose 1 State, SE SE 22-16-36, dry, T.D. 5,501 ft., anhydrite 2,030 ft; salt 2,110-3,190 ft., Yates 3,220 ft., lime 4,840 ft.

N. G. Penrose 1 Rogers, NE SW 12-22-37, dry, T.D. 3,941 ft., water 3,900 ft.

Arrowhead, Lea County: Humble Oil & Ref. 2-G State, SE SE 26-21-36, flowed 7 bbl. in 4 hr., pay 3,724 ft., T.D. 3,840 ft., acid.

Maljamar, Lea County: Maljamar Oil & Gas 10-A Mitchell, SW NE 19-17-32, flowed 200 bbl. through open 2-in., natural, pay 3,977-87 ft.

Oklahoma Fields

(Continued from Page 83)

W. B. Pine 5 Shotwell, NW SE 9-13-12, dry, T.D. 2,256 ft.

Pontotoc County: Hurst & Marshall 1 Malloy, SE SW SW 30-5-4, dry, T.D. 1,941 ft., swabbed 4 bbl. oil.

Recompletions

Apache, Caddo County: Texas 8 Smith, SW NE NW 2-5-12w, flowed 454 bbl. in 1 hr. through 3-in. outlet, sand 3,576-3,836 ft., old T.D. 3,726 ft.

Doyle, Stephens County: Helmerich & Payne 1-B Hefner, NE NW SW 12-1-5w, T.D. 5,912 ft., P.B. 5,450 ft., flowed 35,000,000 cu. ft. gas, 31 bbl. distillate per 1,000,000 cu. ft., pay 5,357-5,410 ft.

Fitts, Pontotoc County: Stanolind 7 Harden, SE NW SW 30-2-7, dry, T.D. 4,208 ft., P.B. 3,580 ft., perf. in Hunton 3,240 ft.

Knox, Grady County: Cox Hamon 1 Mashburn, NW SW NW 16-3-5w, flowed 180 bbl., sand 2,547-70 ft., T.D. 2,594 ft.

Canadian Fields

(Continued from Page 101)

has been placed on the pump. Northwest-Tovell 1, LSD 4, 3-52-7w4, developed a fishing job at 2,260 ft. and as no substantial production was encountered, it is being abandoned. Saskahead 1 has changed location to LSD 7, 32-50-5w4.

Saskatchewan Drilling

In southern Saskatchewan, Northwest Co-Radville 1, LSD 16, 36-5-19w2, is below 7,389 ft., alternately coring and drilling in the lime which was encountered at 4,961 ft. Three porous horizons with oil showings have been encountered in the lime, but it is planned to carry the well to between 9,000 and 10,000 ft. before attempting to test production in these levels. Besides the Madison lime, the underlying Devonian and Ordovician are both regarded as potential producing formations in this area and it is planned to make the well a thorough test.

In southeastern Saskatchewan, Bobjo Mines-Alameda 1 has reached contract depth of 3,500 ft. and is waiting for heavy-duty equipment to deepen to 4,500 ft. or more, where a producing horizon is anticipated.

On an indicated oil and gas structure a few miles south of Fort Qu'Appelle, the Clarke Drilling Co. has spudded a test for the Lakeside Oil & Gas Syndicate of Regina.

Gaspe Oil Prospect

Hon. Edgar Rochette, minister of mines and labor for Quebec Province, has announced that permits have been issued for two tests for oil on the Gaspe Peninsula. One permit has been issued to Imperial Oil, which has carried on extensive preliminary work and was associated with some previous tests in this area. The other permit was to a prospecting company now being organized in Montreal. Drilling operations are expected to start this season.

EQUIPMENT PROGRESS...

NEW EMSCO PLANT AND OFFICE IMPROVEMENTS

When production was being stepped up to greater and still greater demands, Emsco Derrick & Equipment Co. engineers, seeing the part the company was

taking made a careful survey of its manufacturing facilities.

The result was a plant improvement and building program for its Houston branch, which serves the Gulf and Mid-Continent trade. Construction started in the early part of 1941. The two-storied new office building is of reinforced pan-joist construction with reinforced concrete foundations. The exterior is of Cordova cream limestone.

Including 10 private and 5 general offices, and large structural and mechanical engineering drafting rooms, the building is efficient as well as beautiful. Glass block windows on all four sides furnish an abundance of light, and when the sun isn't shining, flourescent lights do a very adequate job of replacing it. Rock-wool insulation helps the air-conditioning system in keeping the office warm in winter and cool in summer.

The personnel building and gas station were completed during the early part of this year. The personnel building is of reinforced concrete and brick and includes a first-aid room, shower and wash room, and locker room. The gas-station building provides a storage room for general gas-station supplies, wash rack, grease rack, and truck parking.

The machine warehouse has a galvanized framework covered with galvanized corrugated sheet iron and the floors are reinforced concrete. Lighting is improved with mercury vapor fixtures.

In the painting section of the warehouse a cabinet-type water-wash spray booth, large enough to admit all equipment manufactured at the Houston plant.

At the present time, work is under way on a central tool crib and tool room.

To improve shop office facilities, three new offices were erected, for the plant superintendent, the production department, the shipping department. These buildings are made of prefabricated steel and are equipped with circulating ventilation and flourescent lighting.

The expansion and improvement program in the galvanizing plant has recently been completed. To provide greater capacity and a general pickling for the galvanizing kettles two extensions were built on the present galvanizing building. The building is constructed of a galvanized-steel framework, corrugated-sheet-iron siding, and an asphalt built-up roof over wood sheeting. To improve efficiency, the equipment was entirely rearranged. Two galvanizing kettles were installed, one containing approximately 131,000 lb. of zinc and the other approximately 225,000 lb. The small kettle is a replacement but the large one is an addition to the previous facilities. Additional electrically operated cranes are provided for use over the new kettle.

New A-C All-Position Welding Electrode

A new electrode designed specifically for all-position welding of mild steel with a.c. type welding machines has been developed by Wilson Welder & Metals Co., Inc., 60 East Forty-second Street, New York City, in the following diameters: 1/16, 3/32, 1/8 and 5/32 in. Made to fill a rapidly growing need for a high quality A.C. electrode for all-position use, the Wilson No. 530 electrode complies with all requirements of the American Welding Society Classification E6011, American Bureau of Shipping, Group H1G and B1G for a.c. and other specifications qualifying it for use on war work.

Results of physical tests demonstrate that this electrode is definitely superior to preceding all-position a.c. electrodes. The high quality of deposited metal of the No. 530 is fully comparable to that of the best d.c. reverse polarity all-position electrodes.

Following are physical test results made on all-weld-metal tensile specimens:

	As welded	Stress relieved
Ultimate tensile strength	70,000-75,000	65,000-70,000
Per cent elongation in 2-in.	25-30	30-35

An outstanding characteristic of this a.c. electrode is that average operators have no difficulty in securing good fusion and complete penetration. The finished weld deposit is quite smooth and has a uniform surface contour.

Cross Type Christmas-Tree Valve by Nordstrom

A special Nordstrom Hypreseal valve with unequal flanges and two side outlets for cross connection is made of alloy steel, with round opening, for 3,000 lb. (W.O.G.) working pressure; 6,000-lb. test. It is worm-

gear operated. The flange sizes are 3 by 8 by 3⅛ by 2 by 2; end flanges are 900 Series and side outlet flanges are 1500 Series.

This type of casting was originated by Merco Nordstrom Valve Co., Oakland, Calif., to effect a more compact and more economical christmas tree by the elimination of two flange joints. The large bottom flange bolts directly onto the tubing head, thus eliminating the unequal-flanged spool formerly used, doing away with one joint. The integral cross does away with the standard four-way cross fitting and effects the elimination of one joint—that between a standard valve and the conventional cross. Similar valves are also cast with but one outlet. The latter are designated tee-type valves to distinguish them from the cross-type valve shown in the illustration. Any combination of flange series can be supplied.

Bergman Represents Mid-Continent

O. A. "Dick" Bergman is now sales representative of Mid-Continent Supply Co., working out of the Tulsa office. He had formerly been connected with Spang Chalfant, Inc.

Tankersley Represents Northrup At Kilgore, Tex.

The Northrup Equipment Co., Parkersburg, W. Va., manufacturers of Neco pumps, have opened a warehouse and pump service at Kilgore, Tex., with A. F. Tankersley as their representative in charge. The warehouse carries a complete stock of Neco products for the East Texas field, and is equipped to service Neco pumps in this field. Mr. Tankersley, a veteran of the first World War, has been in the oil country for 22 years, and because of his years of experience, knows the problems of the engineers and field men. He was formerly connected with Continental Supply Co., and for the past 2 years has been with Northrup Equipment Co., having been stationed at Monahans, Tex.

As representative of his company at Kilgore, he is available for consultation with field men and engineers on their pumping problems in the East Texas field.

CLASSIFIED ADVERTISING

THE MARKET PLACE OF THE OIL INDUSTRY . . .

Patent Attorneys

PATENTS — TRADE MARKS

All cases submitted given personal attention.

Form "Evidence of Conception" with instructions for use and "Schedule of Government and Attorney's Fees—FREE.

LANCASTER, ALLWINE & ROMMEL
Patent Law Offices
418 Bowen Bldg., Washington, D. C.

Leases and Drilling Blocks

LEASES—East Texas, La., South Ark 20 acres up, dollar acre up.—Owners—Address Attorney, Box 1122, Little Rock, Ark.

LEASES ROYALTIES

PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois
20 Years' Experience
Inquiries Invited
B. D. BUCKLEY
Paul Brown Bldg., St. Louis, Mo.

U. S. OIL lands can be filed for Gov. oil lease developing area. Want several join filing block. Small expense. Box B-187, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Oil and Gas leases on proven structures, drilling propositions, small production and fluorspar deposits. Reports furnished. W. P. Harley, Bowling Green, Ky.

CHEAP CRANE COUNTY Sec. 18, B28, under Magnolia-Stanolind leases. Jefferson G. Smith, 215 Littlefield Bldg., Austin, Tex.

OPERATORS: 2800 acres Geologized, want drilled, will checker board or farm. bottom hole money. Box 232, Smith Center, Kans.

FOR SALE: 600 A. Lease Nowata County, Okla. Well equipped water plant, ample water supply, core reports, will sell at sacrifice or in royalty basis. Apply Leo H. Storms, Bradford, Penn., or W. R. Bowman, Kennedy Bldg., Tulsa, Okla.

I HAVE production on a large block of leases and I need capital to properly develop and market. Will make responsible party a very attractive proposition under certain circumstances. The Oil and Gas Journal, Box B-232, Tulsa, Okla.

2700 A. Block of leases is offered for drilling a test well on Junet Structure, in Grant County, Ark., where 20 years ago oil & gas was struck at 2019 feet but never tested. Write to V. Herodes, 1534 So. Pulaski Rd., Chicago, Ill.

STRIPPER property—Kansas—260 acres—cores 37' pay sand with recoverable oil over 6,000 bbls. per acre. Will lease for cash & over-ride. Will bear closest investigation. The Oil and Gas Journal, Box B-240, Tulsa, Okla.

Financing

CAPITAL SEEKERS — Interested in raising $25,000 or more for a legitimate project should communicate with AMSTER LEONARD, Fox Theater Bldg., Detroit, Mich.

OUT OF 5000 American financial houses only 223 bought small issues last few years. The 223 names $4.00. JOHN F MORRIS. Box 5411, Philadelphia.

Geologists

EMPLOY the most direct scientific method of locating oil. Even ten surface soil samples can lead to the discovery of oil. Write P. O. Box 1544, Ft. Worth, Tex.

Oil Industry Printing

OIL FIELD LEGAL BLANKS

Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

Incorporation

DELAWARE CHARTERS: Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

Situations Wanted

MAN with 15 years practical supervising experience in oil, gas, and cycling production. Will furnish details upon request. Box B-233, The Oil and Gas Journal, Tulsa, Okla.

WANTED—Position with permanent location, as Geologist—Seismologist. B. S. and grad. work in geology, 8 years' exp. in geology and seismology. Age 33, Class 3-A, now employed. Will furnish detail information upon request. Inquire Box B-194, The Oil and Gas Journal, Tulsa, Okla.

FINANCIAL backer in oil and gas lease and royalty trading business wanted. Connected with independent oil operator, now retired, for several years. Thorough knowledge of mid-continent and gulf coast areas. Eligible for bar (law) examination. Excellent references furnished interested parties. Box B-231, The Oil and Gas Journal, Tulsa, Okla.

CHEMIST, Refinery Engineer, licensed Chemical Engineer. Texas University Graduate. Thirteen Years experience includes Plant Engineer, Chief Chemist, and Process Engineer. Proven administrative and technical ability. Exceptional record in process studies and cost reduction gasoline and lube manufacture. Major Oil Company training. Draft 3-A. Box B-244, The Oil and Gas Journal, Tulsa, Okla.

MATERIAL man; young, draft exempt, 8 yrs. experience in traffic, drilling & producing equipment, supply store. Best references. Victor H. Williams, 620 W. Block St., El Dorado, Ark.

CHEMICAL Engineer, B.S. Degree. Eighteen years refinery experience ranging from gas analysis to lubricating oil and wax manufacture. D. H. Merchant, 2381 Victoria, Beaumont, Texas.

EXPERIENCED Land, capable in buying Leases and curing titles, needs work. Exempt from draft. Box B-246, The Oil and Gas Journal, Tulsa, Okla.

Help Wanted

WANTED: Thoroughly experienced executive to head producing and leasing department important midwest integrated oil company. The man we seek is likely now engaged as head or assistant in similar department of major oil company. Preliminary information desirable. Correspondence strictly confidential. Box B-242, The Oil and Gas Journal, Tulsa, Okla.

Help Wanted

NOTICE TO ADVERTISERS

Advertisers offering positions to workers skilled in critical war industries are requested by the War Manpower Commission to include the following sentence in their advertisement:

"Applications from those now employed in war industries will not be considered."

ENGINEER — Mechanical, Chemical or Petroleum Refining graduate wanted by Mid-West manufacturer of refinery and gasoline plant equipment. Prefer man with operating or design experience. Permanent position open in company handling only high priority business. Reply stating training, experience, salary and include recent photograph. All replies confidential. The Oil and Gas Journal, Box B-220, Tulsa, Okla.

WANTED: Accountant experienced Petroleum production, refining, taxes, executive ability. Location New York City. Outline complete record and salary expected, draft prospects. Replies confidential. Box B-241, The Oil and Gas Journal, Tulsa, Okla.

OIL FIELD Engine Company has openings for a salesman and a serviceman that can do some selling. These are salaried permanent positions with an established concern. Must be able to leave town. Our men have been advised of this aid. Applications from those now employed in War Industry will not be considered. Give full particulars in letter to The Oil and Gas Journal, Box B-221, Tulsa, Okla.

REFINERY CONSTRUCTION SUPERINTENDENTS

One or two experienced construction superintendents to take responsible charge of large refinery construction work. Only men experienced on refinery construction work will be considered. In reply give experience in detail, technical training, references, age, telephone number, when available and salary expected.

ARTHUR G. McKEE & CO.
2300 Chester Ave.
Cleveland, Ohio

If we do not maintain a classification exactly suited to the type of advertisement you wish to run we shall be glad to create a fitting one.

Classified Department

Royalties

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

WE BUY & SELL all types of Oil and Gas Royalties. Sales restricted to registered dealers only. Grimes Royalty Co., National Mutual Bldg., Tulsa, Okla.

FOR SALE—Landowner's Royalty under 120 acres leased to Humble Oil & Ref. Co. in Lea Co., N. M. North of the Big Hobbs Pool. 27 pools in County. HARRY S. WRIGHT, FARMINGTON, N. M.

Legal Blanks

BURKHART'S legal blanks and general forms serving Mid-Cont. oil field since 1908—Okla. Kans. N. Mex. Tex. Ala. Ark. Fla. Ga. Ill. Ind. Ky. La. Mich. Miss. Mo. Neb. N. Dak. Tenn. Wyo. Free catalog samples on request. Burkhart Ptg. & Sta Co., 115 S. Cinn., Tulsa, Oklahoma.

Ranches and Farm Lands

A GILT-EDGE VALUE in ranch, 2160 acres, priced, $22.50 per acre, well improved, will carry 800 head of cattle and supply all necessary feed; ideal for hog raising; 1100 acres of blue stem, Lespedeza and Bermuda pasture second bottom; 400 acres first bottom in cultivation, part in alfalfa and corn; 700 acres in timber pasture; 30 acres of grafted paper shell pecan grove; 2 modern residences, barns, stock and tool shed; fenced and cross fenced; abundance of water; one hour's drive from Tulsa; may also be purchased with stock and equipment. Blair Realty Co., Tulsa, Okla.

14,000 ACRES ranch, Oklahoma. Is handling 700 cattle. In estate, must sell or will lease for oil or sell lease and royalty. Adjoins block of Major Oil Co. Write for description. Guy Speakman, Liberal, Kans.

Equipment Wanted

WANTED
Large Steel Storage Tanks and Structural Steel Buildings.
GREENSPON'S
National Stock Yards
(St. Clair County), Ill.

WANTED
2—35,000-55,000 bbl. storage tanks.
2—1300' air compressors.
20—25 ton locomotive cranes.
R. C. STANHOPE, INC.
60 E. 42nd St., New York, N. Y

ATTENTION INVENTORS
Old established Pacific Coast Manufacturing Company is interested in acquiring patented or patentable items for manufacture on either outright purchase or royalty basis. American Pipe & Steel Corp., Alhambra, California.

For Sale—Equipment

FOR SALE: 80,000 gallon semi-Spherical elevated steel tank, height of tower to gallery 68 feet 6 inches, 4 foot riser pipe, metal thickness of tank and riser ⅜ inches, located at Hatch, New Mexico. B. F. Archer Mayor, Hatch, New Mexico.

75,000 GALLON semi-spherical elevated steel tank, 80 feet to balcony, 4 foot riser pipe. Located at Hatch, New Mexico. B. F. Archer. Mayor, Hatch, New Mexico.

FOR SALE OR LEASE
1 Steam Powered Heavy Rotary Drilling Rig.
1 Steam Powered Light Rotary Drilling Rig.
1 Diesel Powered Rotary Drilling Rig, good for 5500 feet, using 4½" Drill Pipe.
LARGE LOT OF STEAM EQUIPMENT
2 Spudders with complete strings of Cable Tools, and Gas Engines.
Will sell above for cash or good notes, or will lease to responsible parties, preferably on continuous work.
Might exchange for interest in wildcat leases or production.
Also 3000 feet of used 3½" Drill Pipe, and 5000 Feet of used 4½" Drill Pipe; full hole tool joints; fair condition only for sale at bargain price for cash. Box B-243, The Oil and Gas Journal, Tulsa, Okla.

CLASSIFIED ADVERTISING RATES

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgment is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	$1.05	$1.80	$2.55	$3.30	7 Lines	$2.45	$4.20	$5.95	$7.70
4 Lines	1.40	2.40	3.40	4.40	8 Lines	2.80	4.80	6.80	8.80
5 Lines	1.75	3.00	4.25	5.50	9 Lines	3.15	5.40	7.65	9.90
6 Lines	2.10	3.60	5.10	6.60	10 Lines	3.50	6.00	8.50	11.00

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This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

REFINERY EQUIPMENT

We have three complete refining units available. Each must be sold in its entirety. Inventories furnished on request. Also—miscellaneous towers, vessels, pumps—valves—fittings, steel and cast iron.

Send Us Your Inquiries

SONKEN-GALAMBA SUPPLY COMPANY

W. C. Berry or H. J. Galamba
Riverside at Second, Kansas City, Kansas

Robert W. Duden
Twenty-First at Union, Tulsa, Oklahoma

LIQUIDATING LATE TYPE REFINERY

2000 bbl. Pipe Still, 2½" ID x 2 5/16" OD x 20' Tubes Alloy Headers — 2 Heat Exchangers — Complete Copper Sweetening Unit — New Carload Ethyl Plant — Storage Tanks — 30 Pumps, all sizes — Valves — Fittings — Pipe — 2 Gasoline Tank Trucks, 3 Compartments Each.

THE PLAINS OIL & REFINING CORPORATION
GREAT BEND, KANSAS

NEW—COMPLETE

2 Jensen Bros. pumping units, size 12D, cable type, 34" stroke, with Allis-Chalmers Model B-15 power units equipped with Ensign carburetors for butane-natural gas-gasoline, with controls, etc.

SONKEN-GALAMBA SUPPLY CO.
TULSA, OKLAHOMA

FOR SALE: 12 K.W. Portable Light Plant Powered by 35 H.P. International Engine. Melton Supply Co., Seminole, Okla.

FOR SALE: Complete Wilson Portable Rotary Rig with telescoping mast, suitable for 2,000 ft. drilling. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: Wilson-Mogul Drawworks with water cooled brakes and 100 H.P. International Motor. Melton Supply Co., Seminole, Okla.

FOR SALE
COMPRESSORS

Complete Repressuring or Air Lift Plant for Immediate Delivery.

2—13 & 5½ x 12 Ingersoll-Rand XOB compressors 400# pressure V-belt driven by 120 H.P. Chicago Pneumatic 3-cylinder vertical gas engines.

2—12 & 7 x 10 Chicago Pneumatic 400# pressure vertical compressors direct connected to 120 H.P. 3-cylinder Chicago Pneumatic vertical gas engines complete.

Used very little — excellent condition. Located on original foundation in Louisiana.

EARL E. KNOX COMPANY
Erie, Penna.

FOR SALE

We offer 523, 55-ton all-steel, self-clearing DOUBLE HOPPER CARS consisting of:

160 USRA construction; built 1921-1922; with A-B brakes; 1880 cubical feet capacity.

363 built 1910-1915; with KD-1012 brakes, 1683 feet capacity.

ALL HAVE FULL "U" CAST STEEL TRUCK FRAMES.

Purchaser must buy all.

PRICE: $1700.00 each f.o.t. Pennsylvania

TERMS: Cash with purchase.

DELIVERY CAN COMMENCE IMMEDIATELY AND BE COMPLETED IN ABOUT 60 DAYS—AND VERY POSSIBLY SOONER.

Some $30,000 to $40,000 NEW REPAIR MATERIALS also available which you may wish to have inspected at the same time.

TIME and EXPEDITION ESSENTIAL and DESIRABLE.

Yours for Victory,

IRON & STEEL PRODUCTS, Inc.
37 years' experience
13412 S. Brainard Ave., Chicago, Illinois
"ANYTHING containing IRON or STEEL"

FOR SALE: 6 x 16 Wilson-Snyder Power Slush Pump. Melton Supply Co., Seminole, Okla.

FOR SALE: At Oklahoma City, one Sectional Steel sand or rock storage bin with two dump valves, $350.00. Patridge, Cities Service Oil, Bartlesville, Okla.

7' x 30' STEEL RIVETED Horizontal Storage Tanks. Also towers, vessels, etc. GILBERT PIPE & SUPPLY, Electra, Tex.

3" x 4" F&M Power Pump in excellent condition. Also Centrifugal & Steam Pumps Gilbert Pipe & Supply, Electra, Tex.

DIESEL—GAS—ENGINES

Large selection — All sizes and types. Generator units, marine engines, gasoline engines, auxiliaries—boilers, steam engines, and turbo-generator sets.

Complete information on request.

A. G. SCHOONMAKER COMPANY
48 Church Street, New York, N. Y.

FOR SALE: 50—5½" OD 11½V Thd, 200—7" OD 10V Thd and 25—10" 8V Thd., used CI Flat Plugs, cheap. Patridge, Cities Service Oil, Bartlesville, Okla.

FOR SALE: 27½" Ideal Rotary Table, 5 sheave 200 ton Crown Block, 4 sheave 72" traveling block, 8" Ideal enclosed rotary hook. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: 60—4" 8V Thd. Fairbanks Sphero SE Valves, unrepaired. $10.00 each. Patridge, Cities Service Oil, Bartlesville.

FOR SALE—One 96 foot rotary drilling derrick now standing near Seminole, Oklahoma. Good condition, price $600.00. Inquire Eason Oil Co., Enid, Okla.

FOR SALE: Star Mfg. Company, portable cooling tower, telescoping type, 7' wide, 13' long, 8' high. All steel. Melton Machinery & Supply Co., Seminole, Okla.

FOR SALE: Four 125-HP, 250# working pressure boilers, Oilfield type; also one 7" R. B. Union Tool unitized draw works, good condition, almost same as new. Inquire, T. T. Eason & Company, Enid, Okla.

FOR SALE: Casing in two gas well, pipe and gathering lines, fittings and connections, 12½ and 8¼ inch casing, 5½, 2, and 1 inch line pipe, gates and fittings, wells to be plugged and material sold. W. Ben Turner, Trustee, 103 No. 4th St., Sayre, Okla.

10—40/15 H. P. General Electric Type K Motors, 220/440 Volt 865 R.P.M. Weatherproof with complete control equipment—In original packages—No priority required. Southwest Equipment Co., 705 Ross Ave., Dallas, Texas.

---

25 K.W. and 40 K.W. Gas Engines, 220 volts, D.C. Two 100 K.W. Gas Engine-Generator Sets, 220 volts, D.C. 7x6 Ingersoll-Rand ER-1 Air Compressor. Six-inch Oster Pipe Threading Machine. Also large stock of lathes, pipe machines, milling machines, etc. Send for our list.

Terms to suit.

CINCINNATI MACHINERY & SUPPLY CO
26 West 2nd St., Cincinnati, Ohio.

FOR SALE: Approximately 250—2", 3", 4" and 6" LH EH SL UP Klein Pipe Tongs, used. $1.00 per inch per tong. Patridge, Cities Service Oil, Bartlesville.

3—150-HP 150# Working Pressure horizontal Return Tubular Boilers with breeching, in good condition; also unusually good stock of three, four and six inch valves and fittings for refinery and pipe line service. Call or write Eason Oil Co., Enid, Okla.

FOR SALE — OIL STORAGE TANKS
6—31,000 bbl. with breather roofs.
3—31,000 bbl. without roofs.
In first class condition — ready for immediate delivery.
1—Parkersburg SC-11 Pumping Unit, Stroke 5' to 11'.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards (St. Clair County), Illinois.

FOR SALE: One Waukesha Model CFR Fuel Testing Unit complete with knock-meter assembly. Good condition. Inquire Eason Oil Company, Enid, Okla.

FOR SALE: 50—5½" OD Standard IBBM NRS SE CI Gate Valves, unrepaired. $10.00 each. Patridge, Cities Service Oil, Bartlesville, Okla.

FOR SALE—One—40 K.W. Western Electric Generator powered with 60 h.p. Venn-Severin Oil Burning Engine with direct current Exciter. J. C. Ernest, Cosco Oil Co., Wynnewood, Okla.

FOR SALE: 30—1½ KW Steam Turbine Generators. $25.00 each. Patridge, Cities Service Oil, Bartlesville, Okla.

LINE PUMPS

Two—2½" 4 stage Byron Jackson multiplex with 150 h.p. motors and controls. CORKEN PUMP & MACHINERY CO
206 East Grand Oklahoma City

FOR SALE: 85—7" OD 10V Thd. SE 1500-lb. WP CS Hughes Drilling Through Control Gates, unrepaired. $100.00 each. Patridge, Cities Service Oil, Bartlesville.

FOR SALE: 7¼ x 14 Oil Well Power Slush Pump. Melton Machinery & Supply Co., Seminole, Okla.

20" x 12" ING. Rand Vacuum Pump. Also Compressors, Gas Engines, Bessemer parts. Gilbert Pipe & Supply, Electra, Tex.

FOR SALE: 3—16" Baash-Ross Blow-out Preventers. Patridge, Cities Service Oil, Bartlesville.

Steel VALVES!

Cast and Forged
Also
Cast Iron Valves
Standard and High Pressure

Every Type Used in an Oil Refinery

All Expertly Reconditioned and GUARANTEED to Perform Like New.

No Delays

Immediate Delivery
YOU SAVE 25%
Over Cost of New Valves

Brown-Strauss Corporation
1446 Guinotte . . . Kansas City, Mo.

Oil Price Ceiling Modified to Encourage Central Storage

WASHINGTON, D. C.—Several modifications of the maximum price schedule for petroleum and products designed to encourage the maintenance of central-storage facilities and to simplify certain methods of determining maximum prices for crude oil were announced last week by the Office of Price Administration.

The changes were in the form of an amendment (No. 30) to Revised Price Schedule 88, petroleum and petroleum products, effective August 26, 1942.

The amendment provides a revised method for determining the maximum price at a well and producing on October 1, 1941, the base-price date. It permits the contract price to be paid for all production covered by a contract regardless of whether the well was in production on October 1, 1941. This is accomplished by changing from an "at the well" basis to an "at the receiving tank" basis.

This change was advisable, OPA officials said, as a single contract often covers the output of wells which were producing and those which were not producing on October 1, 1941.

Plan Wartime Maintenance for American Motorized Equipment

Practical plans for operating and maintaining America's fleets of motor trucks, buses, and passenger cars under wartime conditions will be considered at the War Transportation and Maintenance meeting of the Society of Automotive Engineers to be held October 7 and 8 next in the Hotel Pennsylvania at New York. The four technical sessions and dinner which comprise the program will have only five speakers, so that the greater proportion of the time may be utilized by some 500 fleet operators in discussing problems.

ADVERTISERS IN THIS ISSUE

Alco Products Div. American Locomotive Company 4
Alcorn Combustion Company 70
Allis Company, Louis 8A-8B
Allis-Chalmers Mfg. Co. 5
American Chain & Cable Company, Inc. Inside Back Cover
American Steel & Wire Co. 14-15
Armstrong Machine Works 97
Baash-Ross Tool Co. 57
Babcock & Wilcox Tube Company, The 41
Baker Oil Tools, Inc. 18
Baroid Sales Division, National Lead Company 2
Bethlehem Steel Co. 1
Briggs & Stratton Corp. 77
Brown & Brown, Inc. 102
Brown Fintube Co., The 68
Broderick & Bascom Rope Co. Back Cover
Buckeye Traction Ditcher Co., The 73
Burgess Battery Company 54
Cameron Iron Works, Inc. 93
Chain Belt Company 7
Chicago Bridge & Iron Company Inside Front Cover
Classified Advertising 110-111
Cleveland Trencher Co., The 72
Climax Molybdenum Co. 45
Continental Motors Corp. 12
Continental Supply Company, The 96
Cooper-Bessemer Corp., The 35
Davis Regulator Mfg. Co., The 101
Dresser Mfg. Co. 67
Dura metallic Corporation 108
Electrical Facilities, Inc. 73
Emsco Derrick & Equipment Co. 89
Erie Bolt & Nut Co. 99
Fluor Corp., Ltd., The 71
General American Transportation Corporation—Terminal Division 59
General Paint Corporation 87
Graver Tank & Mfg. Co., Inc. 64
Gulf States Utilities Co. 78
Harnischfeger Corporation 82
Hill-Hubbel & Co. 87
Hughes Tool Co. Front Cover
Industrial Engineering Co. 72
Jeffrey Mfg. Co., The 102
Jerguson Gage & Valve Co. 86
Justrite Manufacturing Co. 94
Kellogg, M. W., Company, The 13
Kennedy Valve Mfg. Co., The 90
Landis Machine Company, Inc. 11
Le Roi Co. 55
Lucey Export Corp. 74
Ludlow Valve Mfg. Co., Inc. 48
Lufkin Rule Co. 69
Lunkenheimer Co., The 6
McCord Radiator & Mfg. Co. 69
McEvoy Company 100
Macwhyte Company 3
Martin-Decker Corp. 102
Morse Chain Co. 62
National Supply Co., The 80-81
Norton Company 8
Oil Center Tool Co. 85
Oil Well Supply Co. 51
Pacific Pump Works 91
Patterson-Ballagh Corp. 95
Price, H. C., Co. 73
Rector Well Equipment Co. 103
Reed Roller Bit Company 43
Reilly Tar & Chemical Corp. 73
Republic Steel Corporation 60
Rockford Drilling Machine Div. of Borg-Warner Co. 98
Ross, J. E. 94
Rust Master Chemical Corp. 101
Ryerson & Son, Inc., Jos. T. 94
Shand & Jurs Co. 79
Thompson Products, Inc. 94
Thornhill-Craver Co. 72
Timken Roller Bearing Co. Steel and Tube Division 16
Toledo Pipe Threading Machine Co. 100
Tretolite Company 46
Tube-Turns, Inc. 33
Universal Atlas Cement Company 52
Universal Oil Products Co. 36
Vogt, Henry, Machine Co. 10
Well Head Equipment Manufacturers Association 49
Wilson Mfg. Co., Inc. 9
Young Engine Corp. 103
Young Radiator Company 83

Journalisms:

THIS week we proudly display our growing Service Flag. Its eight stars represent men from four departments of the Journal. Three are for members of the editorial

staff, two each are for members of the business and mechanical staffs, and one is for a member of the advertising force. Three are officers, and one, to our knowledge, has departed for foreign shores. We feel their loss, as we shall the loss of others whom we know will have their stars added.

•

AS this is written, final touches are being put on the new crude-oil and products pipe-line map which will be published as a supplement to the Pipe Line Number late in September. The past year has been a busy one for pipe liners, and it has been a laborious task to revise and bring up to date the map published with the 1941 Pipe Line Number. If the demand for the new map is anything like that for the 1941 edition, it will be a "sell out" before snow flies. And the editors have begun burning the midnight oil preparing copy for the printers on the editorial content of the Pipe Line Number. There is much to report, and every mail is bringing material for the issue. This will be the next "big" issue of the Journal to reach your desk.

•

SPEAKING of midnight oil, editors aren't the only breed that have use for this commodity. Across a parking lot from the Journal's editorial offices is an office building that has been taken over by Army engineers. Nearly every night the windows of these offices are lighted, and busy heads are poring over drafting boards and blue prints—plotting destruction of the Axis. It's cheering to see them, and to know that the Army isn't on a 40-hour week.

•

THE Navy has asked us to publish a notice to the effect that a pressing need for binoculars of the proper type exists, and that the Navy will pay $1 for the use of the binoculars and if they are still in use at the end of the war they will be returned to their owner. The binoculars desired are Zeiss or Bausch & Lomb, in sizes 6x30 or 7x50. Glasses, carefully packed, may be shipped to the Naval Observatory, Washington, D. C. We can think of no better use for those binoculars than aiding the Navy to search the seas. Send yours in today and earn the Navy's gratitude.

CALENDAR

September

NATIONAL PETROLEUM ASSOCIATION, annual meeting, William Penn Hotel, Pittsburgh, Pa., Septemger 17-18.

AMERICAN CHEMICAL SOCIETY, Petroleum Division, Statler Hotel, Buffalo, N. Y., September 10.

October

INTERSTATE OIL COMPACT COMMISSION, autumn meeting, Palmer House, Chicago, Ill., October 1-3.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, regional meeting, St. Louis, Mo., October 2.

AMERICAN GAS ASSOCIATION, annual meeting, La Salle Hotel, Chicago, Ill., October 5-6.

TEXAS MID-CONTINENT OIL AND GAS ASSOCIATION, twenty-third annual meeting, Dallas, Tex., October 8-10.

WESTERN PETROLEUM REFINERS ASSOCIATION, technical meeting, Wichita, Kans., October 9.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, fall meeting, Rochester, N. Y., October 12-14.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS, Petroleum Division, Hotel Ambassador, Los Angeles, Calif., October 12-17.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA, thirteenth annual convention, Wichita, Kans., October 19-21.

NATIONAL STRIPPER WELL ASSOCIATION, annual meeting, Wichita, Kans., October 19.

SOCIETY OF AUTOMOTIVE ENGINEERS, Mid west Fuels and Lubricants regional meeting, Tulsa, October 22-23.

NATIONAL LUBRICATING GREASE INSTITUTE, tenth annual meeting, New Orleans, La., October 25-29.

NATIONAL SAFETY CONGRESS AND EXPOSITION, thirty-first annual meeting, Sherman Hotel-Palmer House, Chicago, Ill., October 27-29.

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(Chief Storekeeper)
*Outstanding Record

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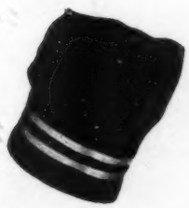
(Yeoman, first class)

FIREMAN
FIRST CLASS

SECOND CLASS
PETTY OFFICER
(Pharmacist's Mate, 2c)



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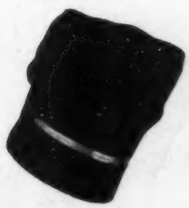
(Electrician's Mate, 3c)



FIREMAN
THIRD CLASS

WORTH KNOWING
WORTH SHOWING!

INSIGNIA OF RATING for the U. S. Navy's enlisted men may be remembered easier by thinking of the men in two groups: "rated" men (Petty Officers) and "non-rated" men.

Petty Officers wear a "rating badge" consisting of a spread eagle and chevrons with a "specialty mark" between. Rating is indicated by the chevrons. When worn with the white uniform the rating badge is blue. Each service stripe ("hash mark") running diagonally across the sleeve is a sign of 4 years service.

*Petty Officers with not less than 12 years service and three consecutive Good Conduct Awards may wear a silver eagle and specialty mark with gold chevrons and gold service stripes. Note that Chief Petty Officer wears coat instead of jacket.

Seniority of non-rated men is indicated by cuff stripes (three, two, or one). A non-rated man of the Seaman Branch (Deck Force) is known as Seaman first class, second class, or apprentice, and wears white braid on his right shoulder (blue braid with the white uniform). A non-rated man of the Engineer's Force wears red braid on his left shoulder and is known as Fireman first, second, or third class according to cuff stripes.

Hughes Tool Co., Houston, Texas

Thin Air IS NO PLACE FOR VOLATILES

. . . Guard Butadiene, Toluene and 100 Octane Gasoline

ELUSIVE volatiles would vanish into thin air—if evaporation could not be *stopped at its source!* Pressure storage through the use of Hortonspheres, offers a positive means of preventing evaporation losses for such important war time volatiles as Butadiene, Toluene and 100 Octane Gasoline. Because gas pressure can build up only in vapor-tight vessels, the fact that pressure does exist in spheres is ample proof that no vapor loss is occurring.

Hortonspheres prevent *all breathing losses* . . . provided that the gauge pressure for which a unit is designed is equal to or greater than the pressure built up in the vapor space. Thus, even during an increase or decrease in internal pressure (caused by day and night temperature fluctuations) no vapor is forced out of the sphere.

Boiling losses are prevented due to the fact that a volatile liquid in a pressure tank can boil only until the pressure in the space above the surface becomes equal to the vapor pressure. At this point, the number of molecules leaving and returning to the liquid is equalized. Evaporation cannot occur unless the vapor space pressure actually exceeds the setting of the relief valve. In addition, *filling losses* are practically eliminated after the first filling by the recondensation of vapor during subsequent fillings.

The future is bright for Butadiene, Toluene and 100 Octane Gasoline—consider Hortonspheres as their working partner.

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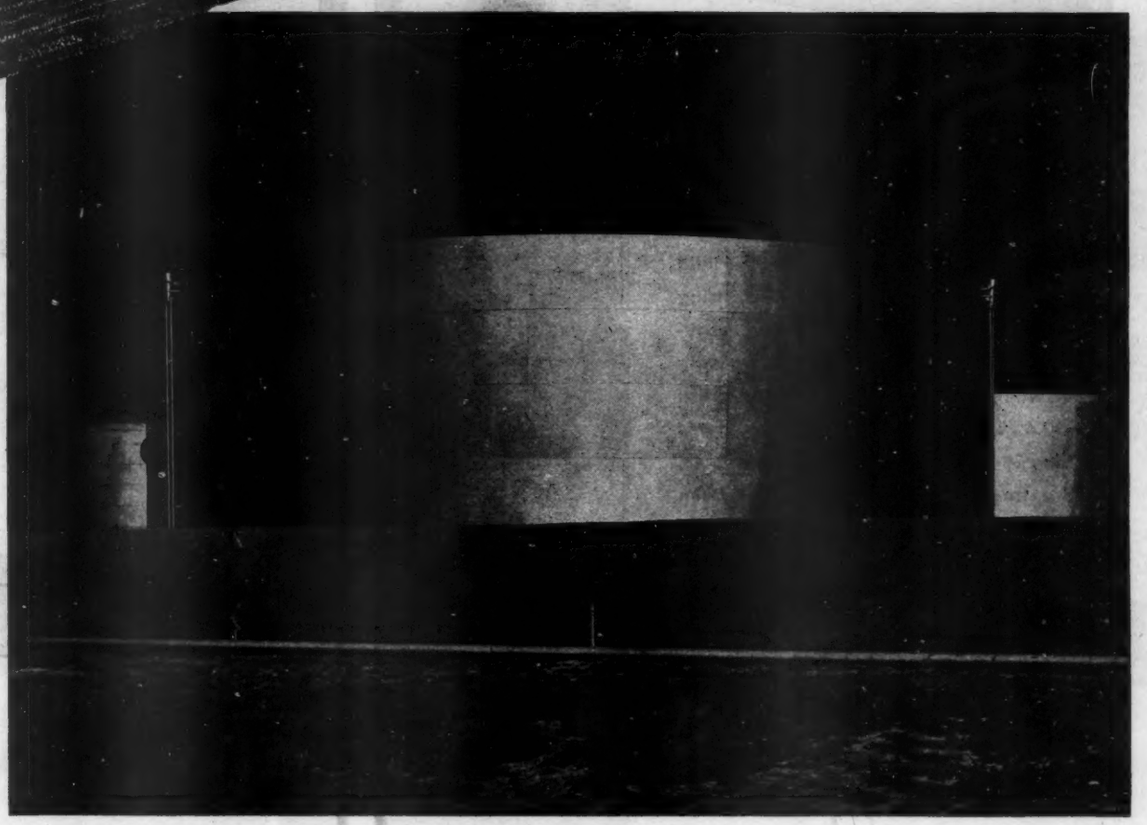
HORTONSPHERES

BUILT BY BETHLEHEM



This 82,000-bbl. all-welded oil storage tank is one of a number in a large tank farm built by Bethlehem. It is typical of the scores of such installations made by Bethlehem for the safe, dependable storage of vital oil supplies.

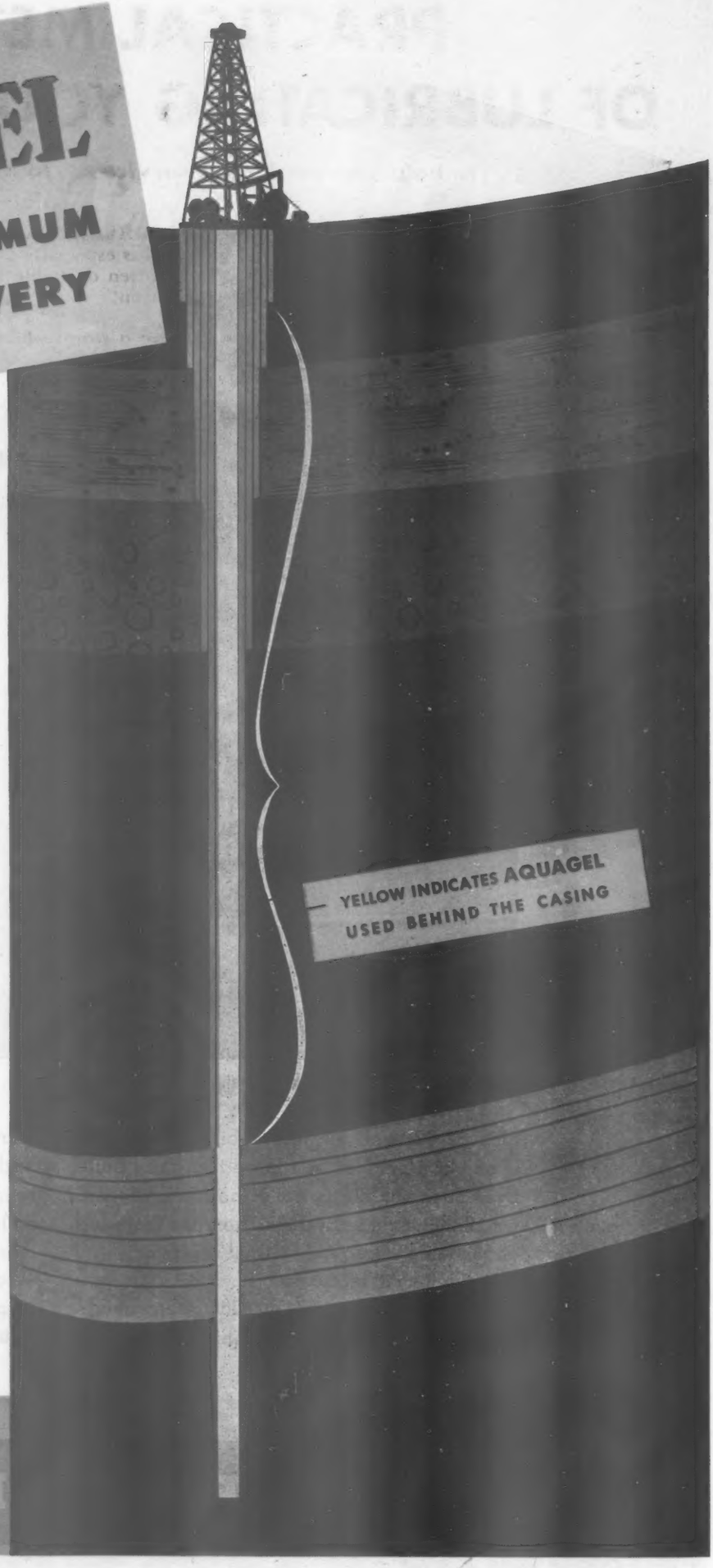
Bethlehem's fabricated steel division, an old-timer in the oil fields, has long been building better tanks, barges, refining units, and warehouses for the oil industry. Behind Bethlehem's service to oil producers and refiners is the triple teamwork of Bethlehem mills producing the steel, Bethlehem plants fabricating the steel, and Bethlehem crews erecting the steel . . . a combination that results in faster, low-cost erection and long, trouble-free life for the equipment you buy.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

AQUAGEL

ASSURES MAXIMUM CASING RECOVERY



AQUAGEL by preventing caving, lubricating the formation, shutting off excessive water flows (all of which prevent freezing of the casing), enables almost 100% recovery of intermediate strings in cable tool operations. As an example, in one field alone where 40 wells were drilled, using AQUAGEL, 39 had complete casing recovery. This is many times greater recovery than when AQUAGEL is not used. Inasmuch as 39.6% of all the wells in the United States during 1941 were drilled with cable tools, the extra casing which could have been recovered, had AQUAGEL been used, would amount to many thousands of tons. In addition, less than half the time is consumed in pulling casing, corrosion is materially reduced and the life of drilling line is prolonged when AQUAGEL is used. These same benefits often apply in rotary drilling.

AQUAGEL and all other Baroid Products, promote economical, fast and safe drilling.

PATENT LICENSES, unrestricted as to sources of supply of materials but on royalty bases, will be granted to responsible oil companies and operators to practice the inventions of any and/or all of United States Patents Nos. 1,575,944; 1,575,945; 1,807,082; 1,991,637 and further improvements thereof. Applications for such licenses should be made to Los Angeles office.

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PRACTICAL METHODS OF LUBRICATING YOUR WIRE ROPE

. . . to help you get longer service . . . to help you conserve steel

The benefit derived from systematic lubrication of wire rope is one of those apparently intangible things that are difficult for the average user to find among his many operating problems. However, laboratory and scientifically controlled field tests have proved that wire rope, like any machine part, lasts longer if it is kept well lubricated.

What are some simple ways to lubricate wire rope on your job?

Preparation

It is very desirable that the rope be clean and dry. A jet of air, steam, or wire brushing, followed by a period in which the rope is allowed to dry, are some of the methods used preparatory to applying the lubricant.

First, you can brush the lubricant on to the rope

FIG. 1

Illustrated, in Figure 1, is one easy and effective method of applying lubrication. Dip the brush into the lubricant and apply. In some cases a rag or piece of sheepskin is dipped in the lubricant and used to swab the lubricant on to the rope.

Applying by hand with leather gloves

FIG. 2

Another simple method is shown in Figure 2. Leather is preferred to canvas, because of its greater protection and less penetration of the grease.

This method is especially good where a heavy, non-flowing lubricant is applied. It is often desirable to heat lubricant slightly to get a smoother, better application.

You can make a simple lubricating device

FIG. 3

A wooden trough with a sheave mounted on a shaft does a good job.

Such a trough, or slush box, is illustrated in Figure 3. The rope is run over the end of the trough, under the sheave, and out the other end so that the rope runs through the lubricant. A rag or swab held in place at the outgoing end wipes off excess lubricant. A slush box for vertical ropes is shown in figure 4.

Proper lubrication helps to seal in the Macwhyte internal lubrication that coyers each wire during the manufacture of the rope. It helps to keep out water and dirt, and guards against corrosion.

Regular inspection of the rope with frequent applications of lubricant produces better results than heavy coatings less frequently applied.

The methods illustrated are those in most common use and cover most wire rope applications. Various methods used in service often depend upon the particular type of lubricant and whether it is applied hot or cold.

The use of wire rope varies so greatly that it is not possible to set forth here any particular types of lubricant to use. Macwhyte engineers are always glad to give you the benefit of their experience in special cases.

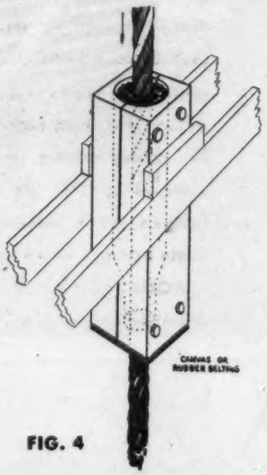

FIG. 4

This is number 12 in a series of informative articles prepared by the Macwhyte Wire Rope Company. All articles in this series are available on request.

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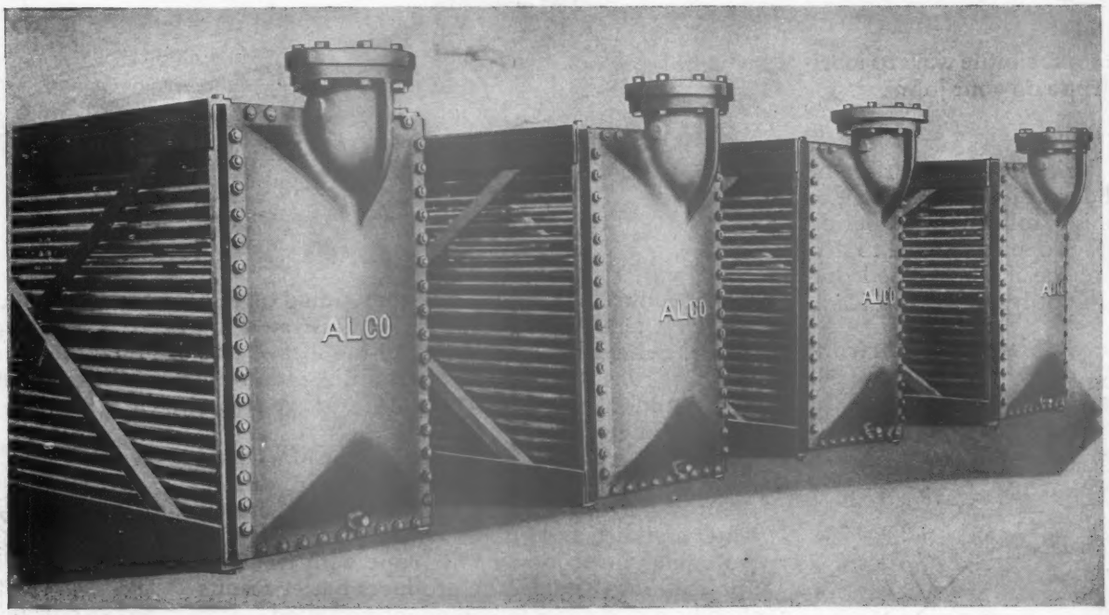
PRE-FORMED
WIRE ROPE

Macwhyte's premier wire rope, famous for its strength, toughness, and internal lubrication.

ALCO

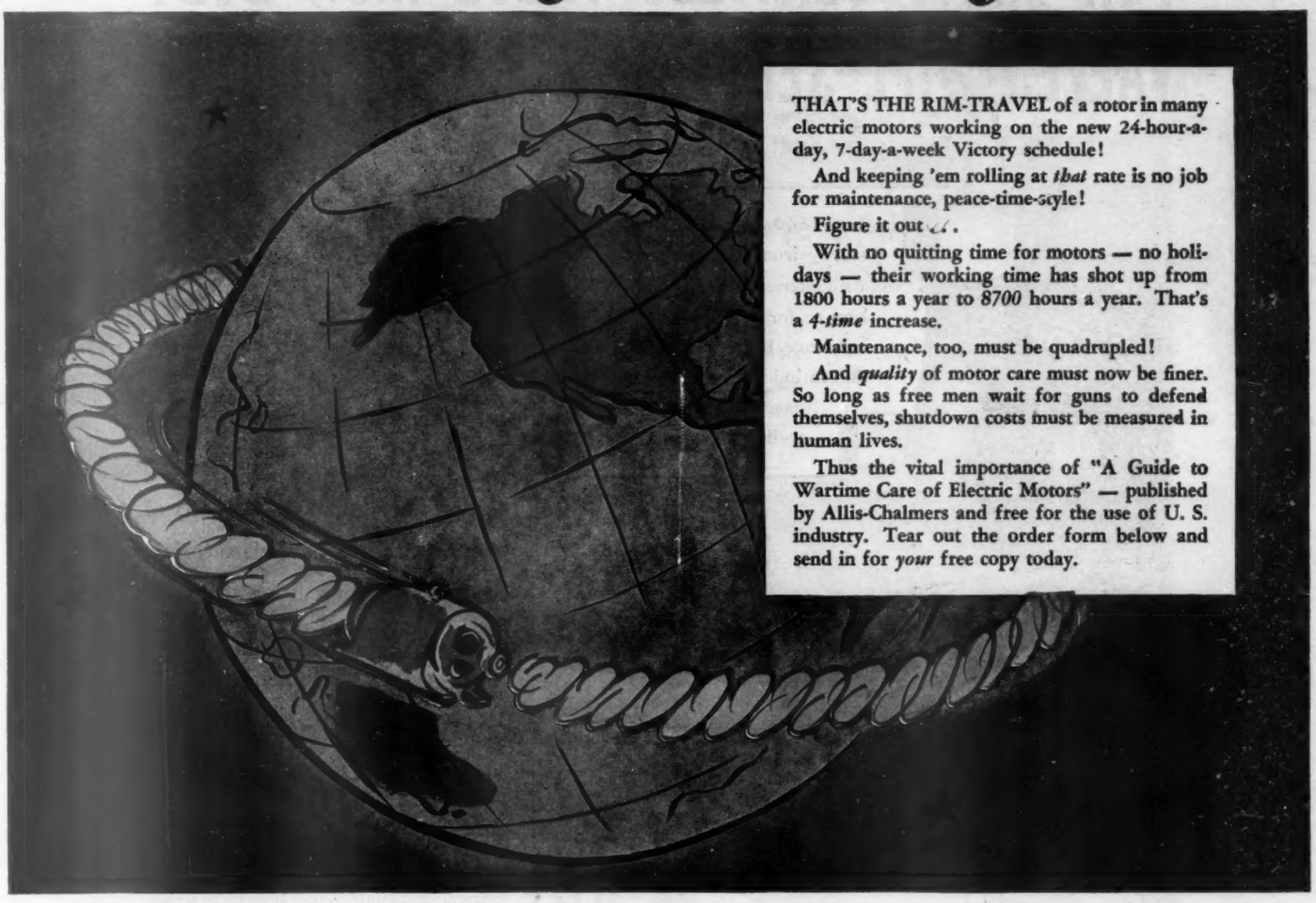
CONDENSING AND COOLING SECTIONS



Use submerged or atmospheric sections whenever possible for condensing and cooling. Their use will provide thermally efficient low cost heat transfer surface and at the same time make it possible to conserve steel plate.

AMERICAN LOCOMOTIVE COMPANY
ALCO PRODUCTS DIVISION
30 CHURCH ST., NEW YORK, N. Y. DUNKIRK, N. Y.

Round the World Every 8 Days



THAT'S THE RIM-TRAVEL of a rotor in many electric motors working on the new 24-hour-a-day, 7-day-a-week Victory schedule!

And keeping 'em rolling at *that* rate is no job for maintenance, peace-time-style!

Figure it out .

With no quitting time for motors — no holidays — their working time has shot up from 1800 hours a year to *8700* hours a year. That's a *4-time* increase.

Maintenance, too, must be quadrupled!

And *quality* of motor care must now be finer. So long as free men wait for guns to defend themselves, shutdown costs must be measured in human lives.

Thus the vital importance of "A Guide to Wartime Care of Electric Motors" — published by Allis-Chalmers and free for the use of U. S. industry. Tear out the order form below and send in for *your* free copy today.

All-out Production depends on All-out Maintenance. Get this free Book →

Here's the answer to the question, how to keep motor maintenance in step with hustling war production? And it's a *clear* answer!

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FOR MANY SERVICES THESE IRON BODY VALVES WILL SERVE AS WELL AS BRONZE

Fig. 1640

Fig. 1640 "KING-CLIP"—a sturdy iron body gate valve with internal working parts of bronze, for hard and continuous usage. It has wide application in industry and in many cases will serve as well as a bronze valve.

—and with proper priorities, you are likely to get better deliveries . . . . .

The availability of bronze valves is becoming an increasingly critical problem, because of the scarcity of copper, tin, and other vital materials necessary in their manufacture.

We recommend consideration of these iron body "King-clip" gate and "Ferrenewo" globe patterns as alternates.

Fig. 1021

Fig. 1021 "FERRENEWO"—an iron body bronze mounted globe valve for numerous services. All parts are renewable and the seat and disc are easy to regrind. An excellent valve with low upkeep.

Since virtually all materials used in the manufacture of valves are on the list of critical materials, valve users are urged to furnish the highest possible preference ratings and proper "end use" Allocation Classification Symbols on their orders. This will be of mutual helpfulness.

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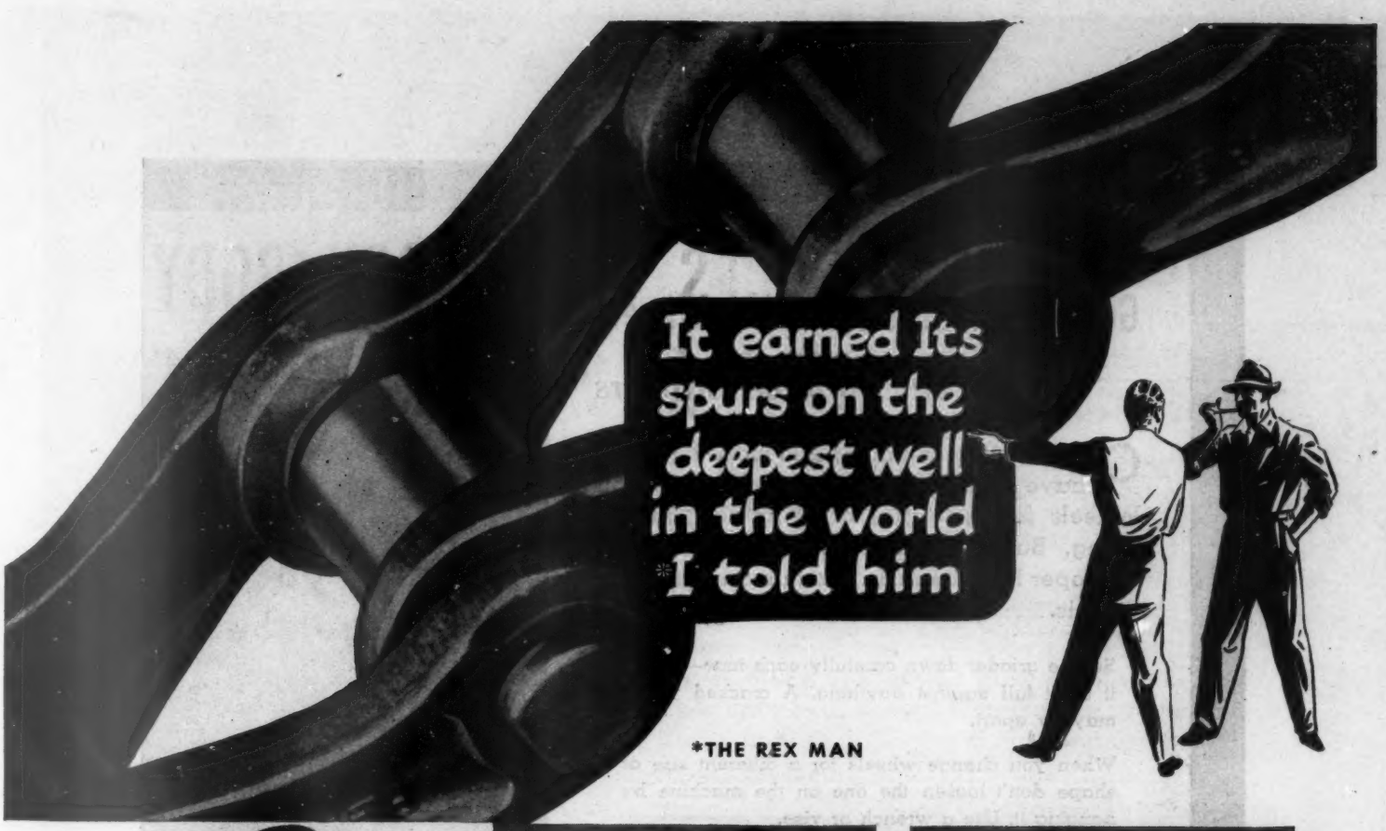
LUNKENHEIMER VALVES



*THE REX MAN

① **"WELL, NOW," THIS DRILLER SAID TO ME,** "that KCLA2—the deepest well in the world, must have been quite a drilling job. On the other hand, couldn't any good oil well chain have done as well on the same job?"

② **"MAYBE THEY COULD,"** I answered. "But remember this: In field after field, where the drilling is deep and you find thousands of feet of stem in the hole, Rex Champion is the chain that's doing the job. Here's why:"

③ **"THE DESIGN IS THE THING!** Look at these accurately forged sidebars—the unusually effective lubrication system. And look at that force-fit assembly that insures against destructive rockings."

④ **"WHEN THE OIL** lies close to the surface and other conditions are favorable, you can use Rex chains that are built for lighter service. Rex makes all types, but for tough drillings like yours, Champion's the choice."

⑤ **"AND BEFORE I FORGET IT,** let me remind you that aside from some outstanding chains, we've also got the finest self-priming pumps that ever worked around an oil well. Rex oil field pumps pump everything."

⑥ **"SAY, I'VE BEEN LOOKING FOR** a good pump—and this Rex pump seems to fill the ticket. Give me the prices, delivery dates—and you'll be hearing from me. I'll check into those Rex Champion chains, too."

Get details and prices on Rex oil well chains and oil well pumps. Visit your nearest Rex supply store, or write: 1619 W. Bruce Street, Milwaukee, Wisconsin.

REX OIL WELL CHAINS

CHAIN BELT COMPANY OF MILWAUKEE

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REX CHAIN BELT COMPANY

Get the Most Out of the Wheels

On Your Portable Grinders

OF course the first thing is to make sure you have the right grain and grade of Norton Wheels for the types of grinding you are doing. But even when this has been done, improper handling can waste many grinding wheels.

Set the grinder down carefully each time—where it can't fall against anything. A cracked wheel may fly apart.

When you change wheels for a different size or shape don't loosen the one on the machine by banging it. Use a wrench or vise.

Keep the wheel free cutting and in balance by truing when necessary. If the speed is too slow the wheels are apt to get out of round and out of balance.

Use just enough pressure to keep the wheel cutting at its best rate and still not slow down or stall the grinder.

Don't hesitate to call in a Norton abrasive engineer. He'll be glad to study your grinding jobs and make sure you are using the most suitable wheels.

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Distributors in All Principal Cities

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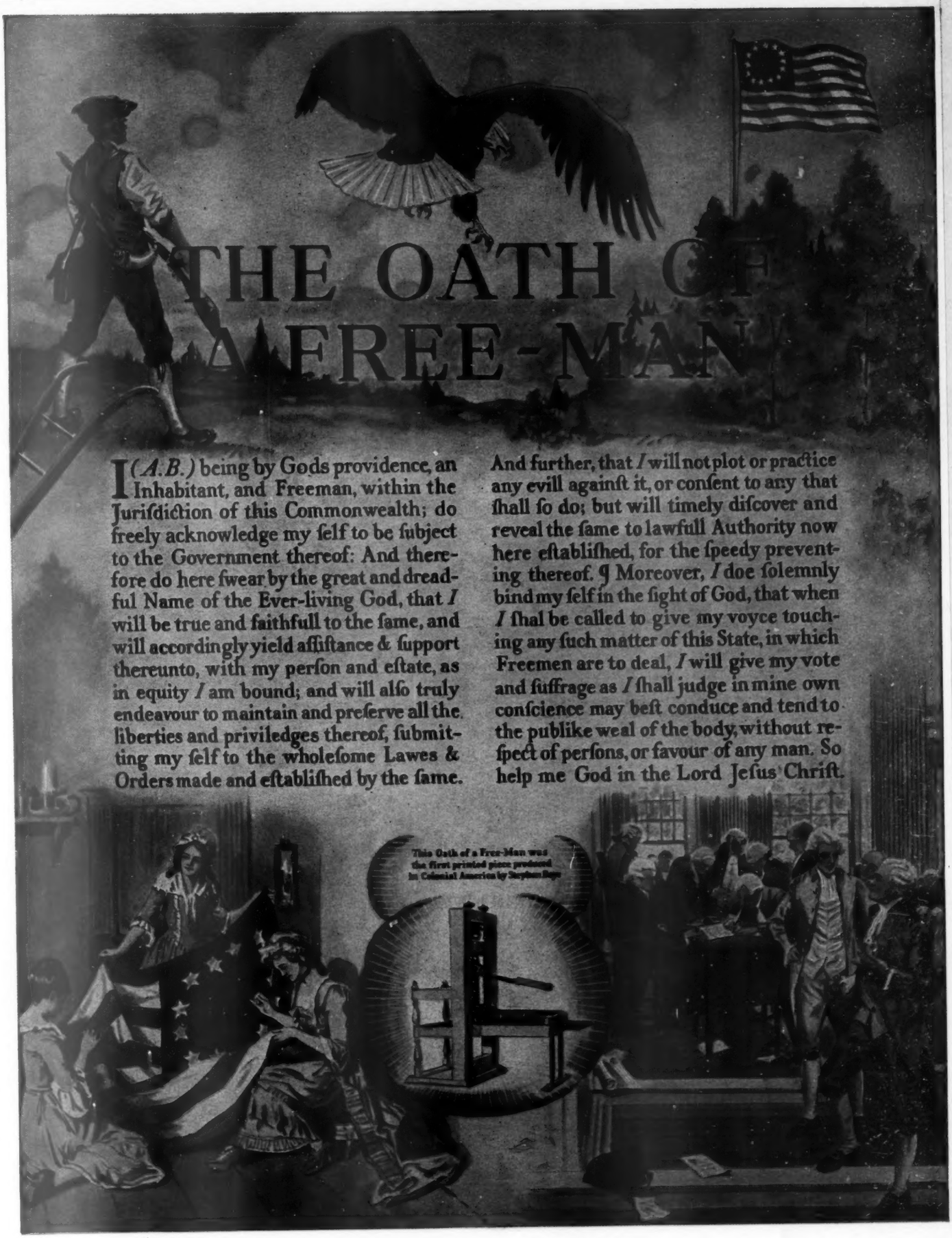
THE OATH OF
A FREE-MAN
I (A.B.) being by Gods providence, an Inhabitant, and Freeman, within the Jurisdiction of this Commonwealth; do freely acknowledge my self to be subject to the Government thereof: And therefore do here swear by the great and dreadful Name of the Ever-living God, that I will be true and faithfull to the same, and will accordingly yield assistance & support thereunto, with my person and estate, as in equity I am bound; and will also truly endeavour to maintain and preserve all the liberties and priviledges thereof, submitting my self to the wholesome Lawes & Orders made and established by the same.
And further, that I will not plot or practice any evill against it, or consent to any that shall so do; but will timely discover and reveal the same to lawfull Authority now here established, for the speedy preventing thereof. ¶ Moreover, I doe solemnly bind my self in the sight of God, that when I shal be called to give my voyce touching any such matter of this State, in which Freemen are to deal, I will give my vote and suffrage as I shall judge in mine own conscience may best conduce and tend to the publike weal of the body, without respect of persons, or favour of any man. So help me God in the Lord Jesus Christ.
This Oath of a Free-Man was the first printed piece produced in Colonial America by Stephen Day

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LOUIS ALLIS
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no matter what your electric motor problem or requirement may be, we invite your inquiry — and assure you that your needs will receive our prompt and careful attention in every way.
TOTALLY ENCLOSED
motor — which is
of electrical and
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BUY WAR BONDS — BUY THEM REGULARLY.

An honest-to-goodness driller can't help but reminisce. Drilling gets in his blood and stays there. Even war can't kill that hankering that lingers in his heart.

This is easy to understand—especially if a man ever has operated a Wilson Power Rig. Its safety, smoothness and simplicity of operation; its power, speed and responsiveness at all times; its stamina, ruggedness and durability under all conditions—all add to the fascination of drilling for oil.

Requires less man hours, money, critical materials and fuel to operate a Wilson unit, too. What's more, they are easier and cheaper to haul than the heavier type of drilling equipment. So, consider all these advantages when specifying a rig. Chances are, it will be a Wilson everytime!

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1 - 4′—0″ dia. x 7′—6″ dia. x 82′—5″ high Stabilizer Tower for a Texas Refinery. Fabricated to A.P.I.-A.S.M.E. Code, stress relieved and X-rayed. 250# working pressure.

2 - Heat Exchangers, for an Eastern Refinery, on the testing floor. Units have fusion welded Monel Metal shells and were built to customer's specifications.

3 - 48″ dia. x 22′—6″ long mud drum for a Vogt Water Tube Boiler designed to operate at 450# S.W.P. Fusion welded to A.S.M.E. Boiler Code.

4 - Battery of Absorption Columns in a Western Refinery. Units are 33″ dia. x 41′—0″ high and were stress relieved after welding.

5 - 400 KV Industrial X-ray unit in our plate welding department. Exographs of welded seams can be quickly made because of the special motor operated rolls and traveling carriages which are adjustable to vessels of any size.

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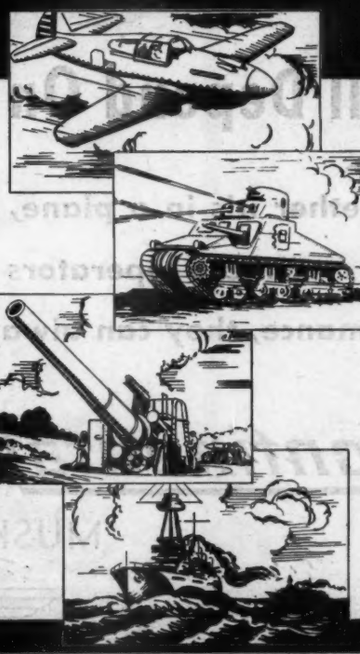

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In the speed-up program of producing Tanks, Aircraft, Bombers, Submarines, Diesel Engines and Destroyers, Landis Machines are confidently relied on day and night by the men and women who are making America's Amazing Production Program possible.

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THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

REPRESENTED IN THE DOMESTIC OIL FIELDS BY:

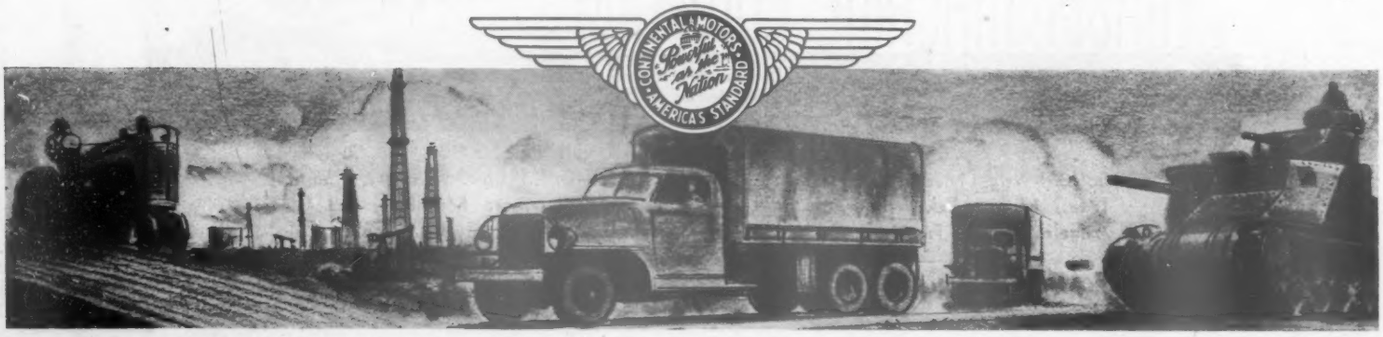
Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; C. J. Harter Machinery, Houston, Texas; Murray-Baker-Frederic, Inc., New Orleans, La.; Moore Machinery Co., Los Angeles and San Francisco, Calif.; Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

"We All Depend On Continental *Red Seal* Engines"

Whether it's in a plane, a tank, a truck, a tractor, or for industrial use — these operators know that when it comes to real performance, they can always depend on Continental Red Seal Engines.

Continental Motors Corporation

MUSKEGON, MICHIGAN



"TAKE UP" with KELLOGG

How to produce speedily and economically 100-octane aviation gasoline required in the national defense program.

Find out how Kellogg-built high octane gasoline plants utilizing the latest and most efficient processes are now aiding in this vitally important program.

To take advantage of Kellogg's experience in all branches of processing, engineering and construction is one of the best ways for any refiner to help to "keep 'em flying."

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DESIGN, CONSTRUCTION and LICENSING

- **Catalytic Processes for Cracking, Hydroforming, Reforming, Dehydrogenation, Alkylation, Desulphurization**
- **Gasoline Products Company, Inc. . . . . Pyrolytic Cracking**
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Catalytic Cracking Continuous Process
Hydroforming
Catalytic Polymerization
Alkylation
Thermal Polymerization
Thermal Reversion

URGENT·

DERRICKS INTO TANKS . . .

An average 122-foot derrick weighs almost 15 tons. That's as much scrap as is needed to make steel for a medium tank.

PIPE INTO BOMBS . . .

1000 lbs. of scrap pipe added to the same amount of pig iron is enough for eight 250-lb. bombs. Hundreds of old oil wells still contain casing. Start a program for removing old casing.

BOILERS INTO TANKERS . . .

3000 tons of old boilers, steam engines, drilling units and hoists will help make 6000 tons of steel—enough to build a new tanker.

• • Steel mills must have 140,000 tons of scrap every day

THAT'S a lot of metal. It would take a 58 car freight train from *every* state in the union every day to haul that much scrap.

An acute scrap shortage is here. Usual sources of supply are running low. Now it is absolutely necessary to gather in every possible type of scrap from the most distant locations.

Oil field scrap comes in heavy pieces and can be readily prepared for the furnace. It is good scrap for making steel.

HOW YOU CAN HELP

Any scrap drive, to be successful, needs the backing of every oil company, every refinery, every factory, mine, railroad—even the farms and homes of the nation.

Enthusiastic promoters needed. A continuous scrap drive must have a man at the head who can get action out of the entire organization. He should be an executive and have power to make decisions. If you fail to get an aggressive man at the head, much valuable iron and steel will be left to rust away in distant locations.

Take these 5 steps to "Get in the Scrap"

1. Put one man in charge of salvage in each location, with authority to decide what is scrap.

2. Comb all your properties for dormant scrap, unused and abandoned equipment, broken tools, trucks, etc.

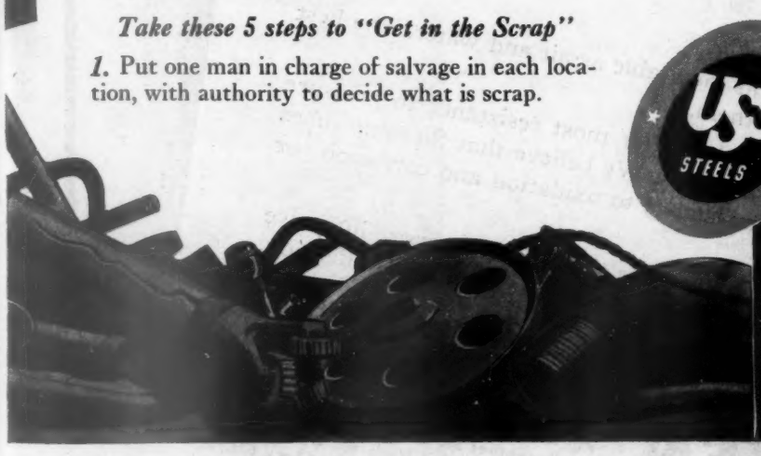
3. Survey all stock equipment, particularly idle, with a view to whether it will be used again or can be scrapped.

4. Devise awards and incentive systems to recognize effective work in the conservation and salvage program.

5. Use constant reminders in the form of posters, illustrations of right and wrong methods, pay envelope enclosures. These are potent aids in the conservation program.

Complete information on how to organize a scrap program can be obtained from the War Production Board, Bureau of Industrial Conservation, Washington, D.C., or from various local offices.

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York* · CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago* · COLUMBIA STEEL COMPANY, *San Francisco* · NATIONAL TUBE COMPANY, *Pittsburgh* · TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham, Alabama*



USS STEELS

UNITED STATES STEEL

These three imps are as inevitable as air and water. The best we can do is control them.

We believe that DM tubes offer most resistance to pressure and creep per dollar invested. We believe that Sicromo tubes provide the highest resistance to oxidation and corrosion per dollar invested.

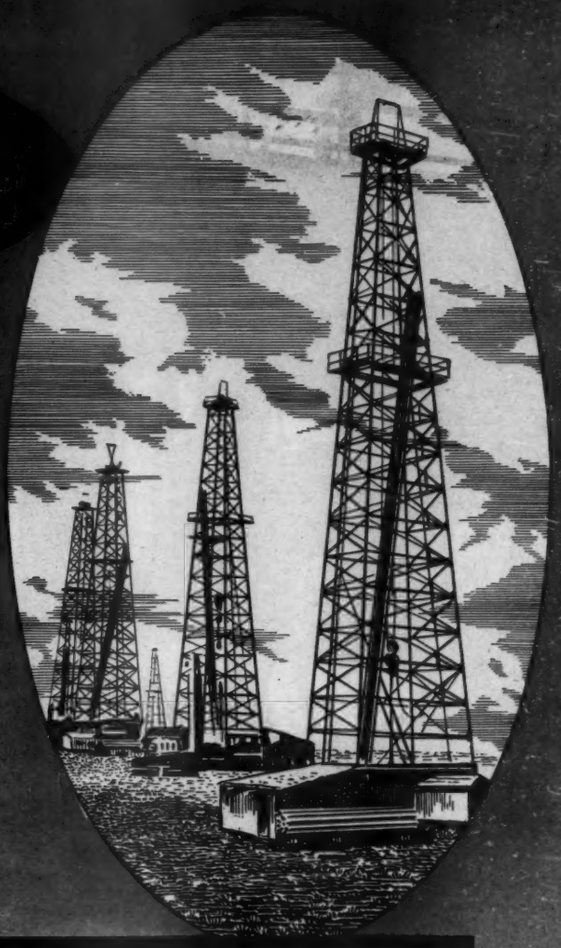
Our belief is backed up by more than fifteen years of intensive research, experiment and testing. Consult us without obligation.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
Steel and Tube Division

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
SEAMLESS STEEL TUBES

Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; and Timken Rock Bits.

S&J



- AUTOMATIC TANK GAUGES
- REGULATOR VALVES
- SHEAVE BRACKETS
- CABLE WINCHES
- SWING JOINTS
- GAS EXHAUSTERS
- SAMPLING BOMBS
- FLAME ARRESTERS
- BREATHER VALVES
- SAMPLING WELLS
- MANHOLE COVERS
- GAUGE COVERS
- SAFETY VENTS
- ROOF FLANGES
- LIQUID LEVEL INDICATORS
- LINE BLINDS
- LEVEL ALARMS
- TANKER FITTINGS

HELPING *BRIDGE THE GAP*

From natural rubber to synthetic there is a gap filled with many unknown factors. From laboratory or pilot plant to quantity production there are many problems to be solved in the storing, measuring, transferring, and conserving of valuable and volatile liquids.

Having long served the petroleum industry of the world, it is only natural that we should be keeping step with developments in the petro-chemical and process industries. Our engineers are constantly developing new equipment to meet the demands of new processes—our factory is working around the clock to produce the mass of equipment required.

If you are planning immediate expansion of manufacturing facilities which involves the handling of valuable liquids, we shall gladly help you with the problems incident to storing, gauging, handling, conservation and fire protection. We maintain a large technical staff that is anxious to serve you in bridging the gap.

SHAND & JURS CO.

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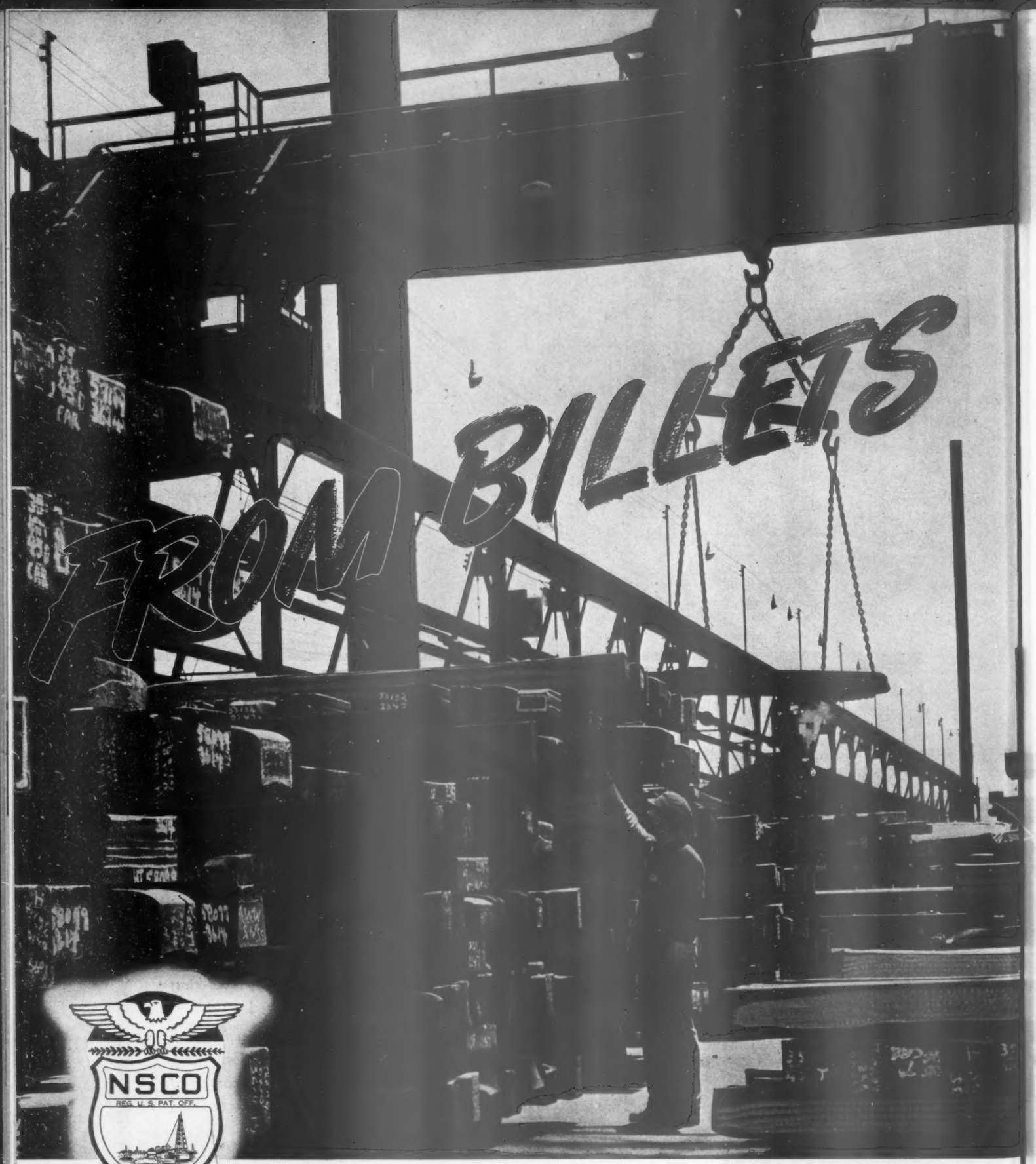
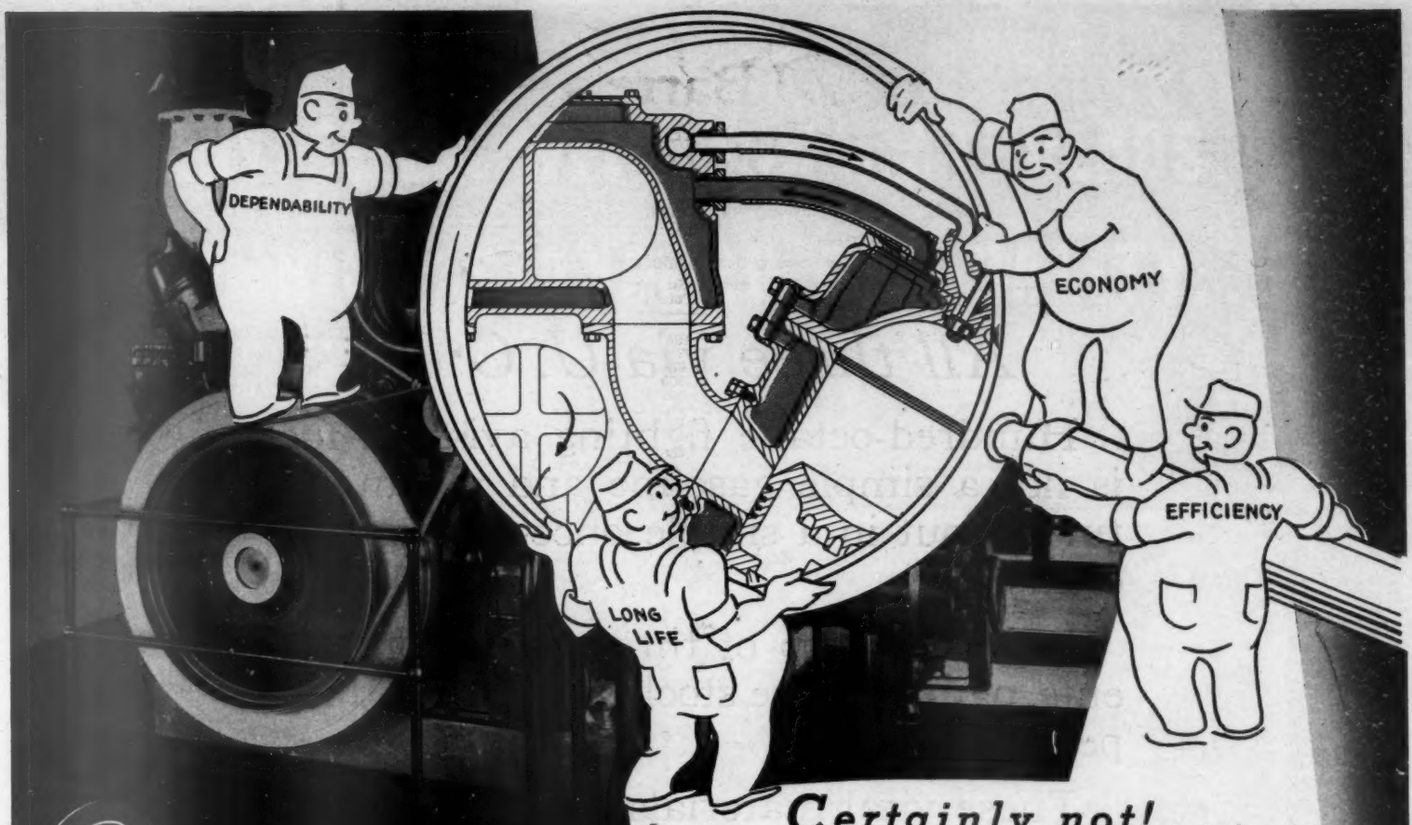
SHAND & JURS



THE NATIONAL SUPPLY COMPANY

Executive Offices: Pittsburgh, Penna. • General Sales Office: Toledo, Ohio • Division Offices: Fort Worth, Texas; Tulsa, Okla.; Torrance, Calif. EXPORT: The National Supply Corporation, 30 Rockefeller Plaza, New York, N. Y., U. S. A.; River Plate House, 12 South Place, London, E. C. 2, *Limited Liability.*



Sponge a Hot Horse with Ice Water?

Certainly not! . . .

and the same applies to an engine.

The cooling system of the Type G-MV compressor is efficient and simple. An unusual volume of water flows through the lube oil cooler, thence into the engine system. Circulation from cylinder jackets to heads is through *outside* jumpers—eliminating those troubles so common in wet-joint-type construction. Flow to compressor cylinders is easily and closely regulated by valves. Temperature-differential between inlet and outlet water is kept low by fast recirculation . . . controlled within ideal limits.

In short, this cooling system . . . fool-proof and trouble-free . . . spells economy, efficiency, dependability and long life. Write for Bulletin G-MV.

THE COOPER-BESSEMER CORPORATION
MOUNT VERNON, OHIO GROVE CITY, PA.

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***Industry's Most Flexible Compressor*—Type G-MV is built in 400, 600, 800 and 1000-hp units, with a full range of compressor cylinder types.**

TYPE **G-MV** ANGLE **COMPRESSOR**

by **Cooper-Bessemer**

ENGINE BUILDERS SINCE 1833

All three via U. O. P.

Hundred-octane fighting aviation fuel is not a simple gasoline and it can't be turned out in a simple once-through operation

It is made up of three basic components, namely, base stock, alkylate and isopentane

These vital materials are produced by Universal processes speedily and efficiently More and more 100-octane gasoline will be needed to "keep 'em flying"

Those processes are not war babies They were developed through years of Universal research The war found them ready to go

Any or all of them are at the service of all refiners under license from Universal —at the service of Uncle Sam

OIL IS AMMUNITION—USE IT WISELY

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

THE REFINERS INSTITUTE OF PETROLEUM TECHNOLOGY

MANY SIZES, WEIGHTS *and* THREADS...
ONE HIGH STANDARD OF QUALITY...

"OILWELL" Bull Plugs and Swaged Nipples are doing a whale of a job on the production front. They are furnished in a great variety of pipe sizes, weights and threads, also plain-end, beveled for welding. These tough soldiers of seamless steel are saving valuable time and material in connecting pipe for all kinds of service.

While the selection of sizes, weights and threads is extremely wide in variety, quality is confined to one high standard. "Oilwell" Bull Plugs larger than two inches and Swaged Nipples larger than one-and-a-half inches in size are manufactured from new seamless steel pipe by means of modern forging methods and equipment, assuring full strength throughout. Bull plugs two inches and smaller and swaged nipples one-and-a-half inches and smaller in size are machined from solid bar stock.

Threading is a precision job. Good, clean, uniform threads are a matter of pride in the manufacture of "Oilwell" Bull Plugs and Swaged Nipples. Ends are faced square . . . beveled on the outside for easy starting . . . chamfered on the inside to remove hazardous sharp edges.

"Oilwell" Bull Plugs and Swaged Nipples are stocked at branch stores and warehouses. Get them in the sizes, weights and threads you want at the nearest "Oilwell" store or order through any "Oilwell" office.

OIL WELL SUPPLY COMPANY

EXECUTIVE OFFICE—DALLAS, TEXAS
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DALLAS, TEXAS LOS ANGELES, CALIF.

Branch Stores Serving All Oil Fields
United States Steel Corporation Subsidiary

EXPORT DIVISION OFFICE—
30 ROCKEFELLER PLAZA
NEW YORK CITY

ANOTHER SUCCESSFUL SQUEEZE

2 MILES DOWN..

with Improved

UNAFLO

the cement with the retarded set

TO BE EXACT, the squeeze in this particular Texas well was made at 10,600 feet. It took 450 sacks of *improved* Unaflo cement. The bottom hole temperature was 165°F.

Two hundred and fifty bags of Unaflo were used first. But the pressure was not enough. Perforations were cleared with mud. Six hours later 200 more sacks were mixed at an average weight of 16½ lbs. per gal. Pressure reached 5,800 lbs. when 168 sacks had been squeezed through. Because of Unaflo's retarded set, the cement remained fluid and the excess cement was reversed out of the hole easily.

Not a tough job, you say. The bottom hole temperature was only 165°F. But it is another of the many successful jobs that *improved* Unaflo has done below the 10,000-ft. mark.

It is not only the spectacular cementing jobs that prove the full value of Unaflo cement. Rather, it is the consistent, day-to-day, dependable performance of this cement with the retarded set which has earned its high reputation among oil men. Original Unaflo gave satisfaction for years. And *improved* Unaflo, developed after further years of research and testing in the laboratory, in the plant and in the field, has new advantages which assure even greater cementing economy and safer, better cementing on all kinds of jobs. Ask your dealer for *improved* Unaflo. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Amicable Building, Waco; Oklahoma City; Kansas City; Chicago; Birmingham.

OS-U-27

The economy of "buying a little bigger"

Information Supplied by "Oil and Gas Journal"

Buying equipment just capable of doing the immediate job is a false economy sometimes practiced by refiners who are not certain of their future needs.

The purchase of a pressure vessel by a certain refinery is a case in point. After installation it was operated at the desired cracking pressure for several months. Then loss of some metal was noted. Continuation of the loss would have necessitated a reduction in operating pressure.

At the very time this was being discussed attention was called to the rising octane value of all grades of gasoline in which the company was in competition and the desirability of an increase in average octane value to meet this competition. This could be accomplished either by using more lead to the ethyl, which was impracticable because of high cost and scarcity, or by increasing pressure in the cracking system. This, because of the limitations in the pressure vessel, mentioned before, was equally impracticable.

Good judgment in the choice of the equipment, anticipating future needs by "buying bigger" if study of current trends points that way can avoid trouble and save metals.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

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MOLY

Our armed forces are "pouring it on" with increasing effect on many fronts... on land, sea and in the air. Their gallant actions everywhere are graphically demonstrating this fact. Fuels, lubricants, synthetics and explosives are the ammunition the oil industry is pouring out... it must be the best!

Tretolite Company products and personnel are available always to help you keep your crudes up to high standards by reducing B. S. and W. to a minimum. Your Tretolite representative will help you "pour it out"... ready for the refinery.

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DEHYDRATING **DESALTING**

Complete Service for Every Field

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ST. LOUIS COUNTY, MISSOURI
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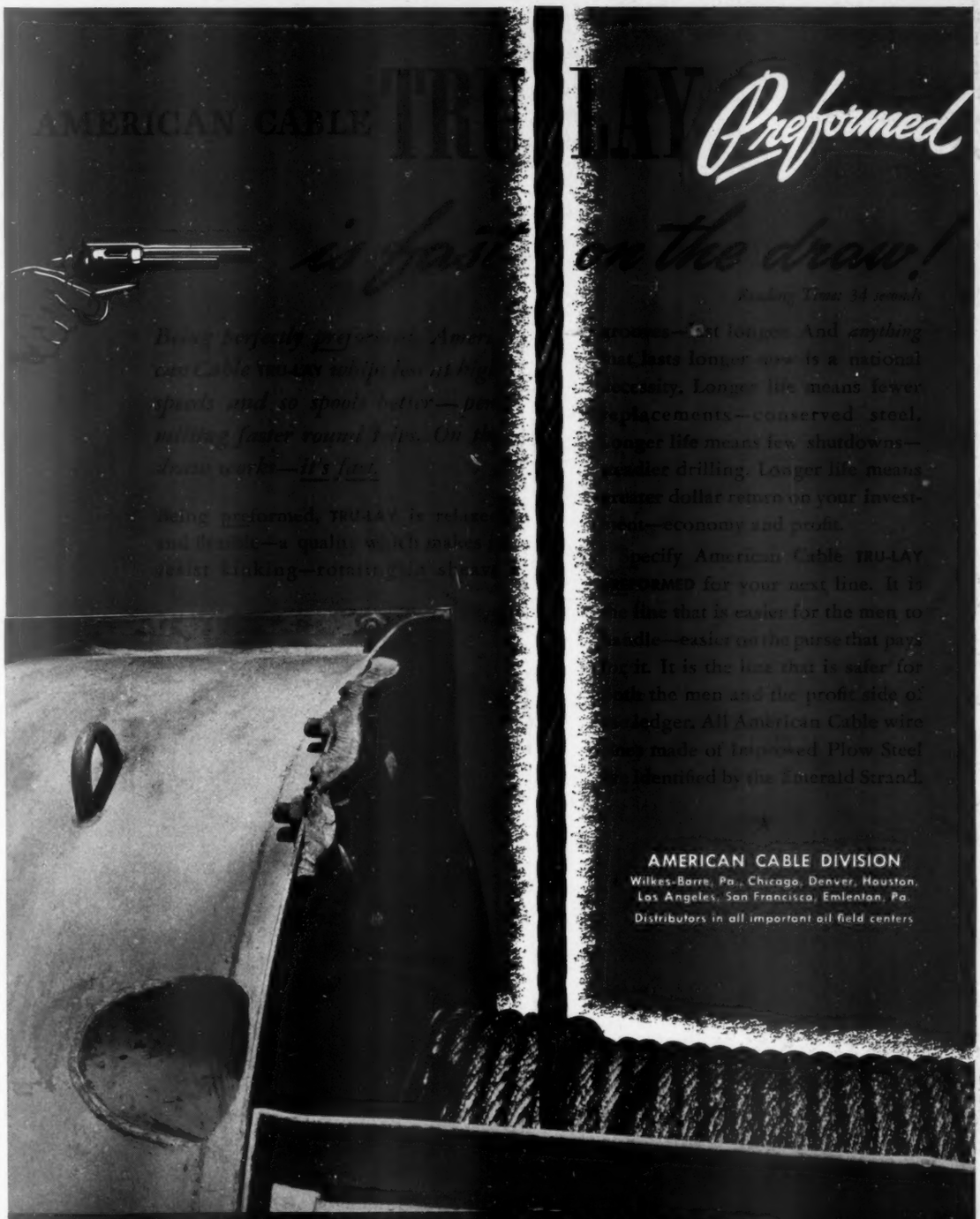

AMERICAN CABLE TRU-LAY Preformed

as fast on the draw!

Reading Time: 34 seconds

...ost longer. And anything ...that lasts longer now is a national ...ecessity. Longer life means fewer ...replacements—conserved steel. ...Longer life means few shutdowns—...endless drilling. Longer life means ...greater dollar return on your invest-...ment—economy and profit.

...Specify American Cable TRU-LAY ...PREFORMED for your next line. It is ...the line that is easier for the men to ...handle—easier on the purse that pays ...for it. It is the line that is safer for ...both the men and the profit side of ...the ledger. All American Cable wire ...rope is made of Improved Plow Steel ...and is identified by the Emerald Strand.

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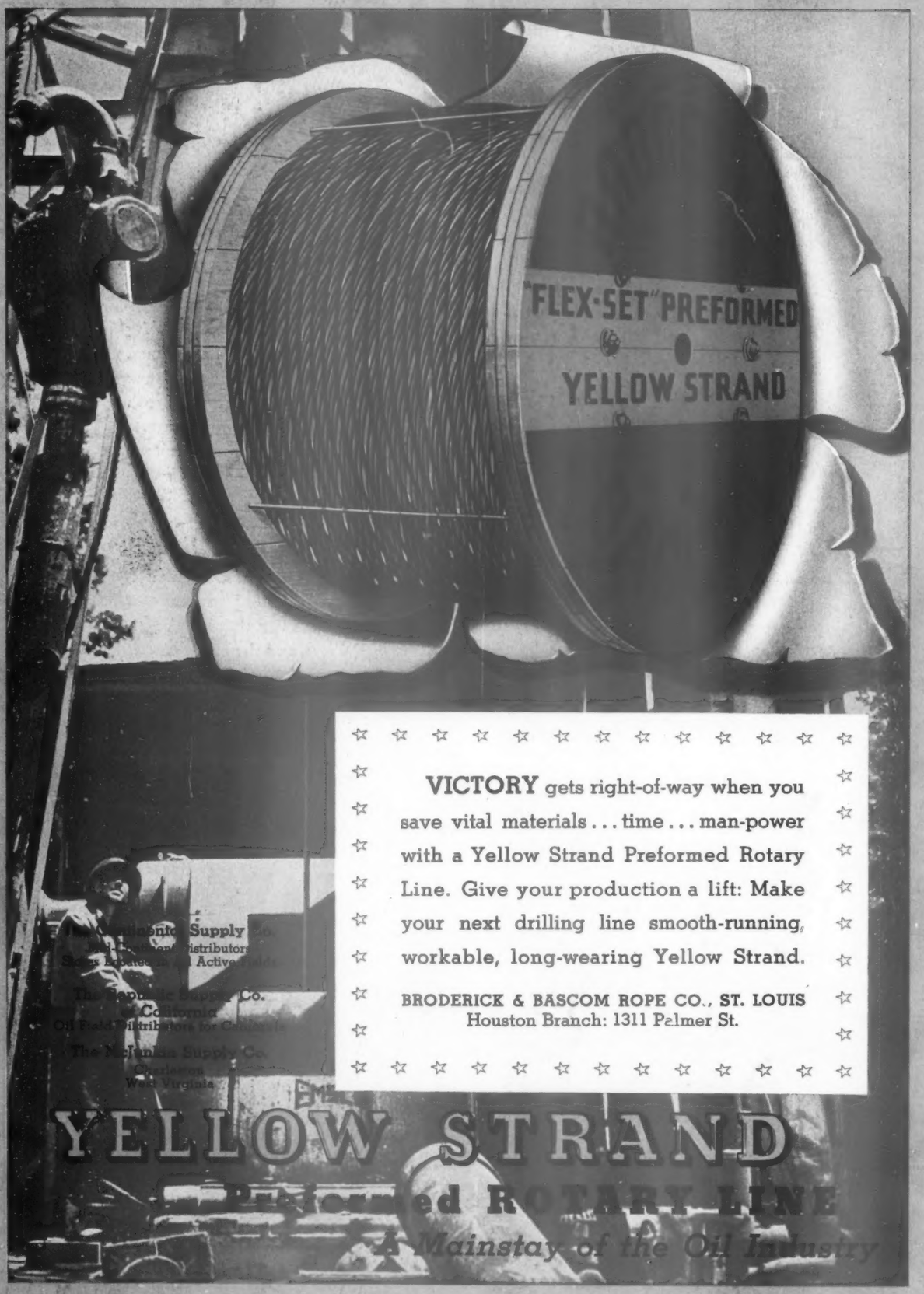
ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*



VICTORY gets right-of-way when you save vital materials . . . time . . . man-power with a Yellow Strand Preformed Rotary Line. Give your production a lift: Make your next drilling line smooth-running, workable, long-wearing Yellow Strand.

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